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**SMELTER AREA INVESTIGATION REPORT  
EVERETT SMELTER SITE  
EVERETT, WASHINGTON**

October 7, 1998

*Prepared for:*

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## **1.0 EXECUTIVE SUMMARY**

This report describes the findings of an investigation to provide additional characterization of the nature and extent of contamination at the former smelter operations portion of the Everett Smelter Site, which is located in northeast Everett, Washington. The Everett smelter operated from 1894 to 1912 and the structures were demolished by 1915. Portions of the former smelter area were redeveloped for residential use in the 1930s and 1940s and construction of a road interchange at East Marine View Drive and State Route 529 occurred in 1956. A portion of the former smelter area has been purchased by Asarco and fenced off. The residential structures in the fenced area have been demolished and only foundations and ground-level structures remain.

Environmental conditions in the former smelter area have been evaluated in previous investigations and general remedial options have been identified and analyzed as documented in the Remedial Investigation and Feasibility Study reports. The recent smelter area investigation described in this report was designed to fulfill the requirements for additional characterization as specified in Enforcement Order DE97TC-N119 issued by the Washington Department of Ecology (Ecology):

"to identify the nature and extent of extremely hazardous waste, federally designated hazardous waste, state dangerous waste, and any other soils or material that may be a contaminant source for surface and groundwater in and adjacent to the smelter site. The smelter area is defined as the former smelter property east of State Route 529. Asarco shall conduct an investigation to determine the location and volumes of material in the waste categories listed above."

In addition, information needs were identified during a series of mediation meetings among Ecology, Asarco, the City of Everett, various citizens groups and other interested parties. These meetings were intended, in part, to identify and evaluate comprehensive cleanup actions for the entire site, including the former smelter area. To meet the information needs identified during mediation, the scope of the smelter area investigation was expanded from the requirements of the

Enforcement Order to include sampling in additional areas and an evaluation of the extent of till to provide additional information on groundwater pathways to the lowland area.

The smelter area investigation entailed collection of soil samples at 60 locations to depths up to 39 feet. Test pits were used in the smelter footprint to assist in the evaluation of smelter remnants and residual materials. Samples were analyzed for total arsenic and lead. Selected samples were also tested for leachability and toxicity and the nature and extent of till was evaluated in key locations. The investigation was implemented to gather as much pertinent information as possible. Rapid turnaround time by the analytical lab allowed for deeper samples to be collected at locations where arsenic concentrations indicated the potential for smelter residuals at the maximum depth specified in the Sampling and Analysis Plan.

In addition to obtaining information as required under the Enforcement Order and identified during mediation, a practical and overarching goal of the investigation was to characterize the location of smelter residuals with respect to the fenced area and immediately surrounding areas. The principal findings are:

- The investigation confirmed that the smelter materials of primary interest are residuals of arsenic trioxide (in pure form containing approximately, but less than, 760,000 mg/Kg arsenic) and flue dust (containing approximately 25,000 mg/Kg arsenic).
- Intact floors and foundations of former smelter structures were found at between one to four feet below current ground surface at locations inside the fenced area. Debris from smelter demolition is present above the intact floors within the footprints of former smelter structures and in immediately adjacent areas. Residual arsenic trioxide and flue dust is present, usually mixed with smelter demolition debris, within and adjacent to the footprints of structures where they were handled, processed or stored during smelter operations.
- Soil borings did not encounter smelter residuals immediately outside the fence to the south between Hawthorne Street and East Marine View Drive. Soil borings drilled inside and outside the fence along the western boundary of the fenced area indicate that smelter residuals are not present outside the fence along Hawthorne Street. These findings indicate that smelter residuals are not present in residential properties further from the fenced area

and these properties would not require more detailed testing than ultimately required for residential investigation. However, sampling of residential properties immediately adjacent to the western and southern fence may be appropriate to confirm the prior finding.

- Soil borings drilled around Medora Way and Whitehorse Trail did not identify the presence of smelter residuals.
- Shallow soil borings drilled in the fill beneath the State Route Overpass indicate that the fill contains small amounts of smelter material. Arsenic concentrations in these soils were significantly lower than in smelter materials present in the fenced area.

The information collected and data generated through the smelter area investigation was combined with pertinent data from previous investigations to identify the nature and extent (volumes) of soil and other materials which, if excavated, potentially would be classified as extremely hazardous waste (EHW), federally designated hazardous waste, and State dangerous waste (DW).

State waste classifications for materials were determined based on the Washington Administrative Code (WAC) and by bioassay testing. Based on the smelter area investigation results, arsenic levels for waste categories are greater than 760,000 mg/Kg for EHW and greater than 10,000 mg/Kg for State DW (the highest concentration in the bioassay tests: ultimately a higher number could be expected based on future testing). No additional Toxicity Characteristic Leaching Procedure (TCLP) testing was performed during the recent smelter area investigation and the arsenic concentration of 3,000 mg/Kg determined by previous investigation was used as the level at which excavated material may be classified as federally designated hazardous waste. Based on this evaluation the aerial extent and depths of materials which, if excavated, would fall under the different waste categories were estimated. The findings are as follows:

- No EHW has been identified at the site.
- Materials which may be classified as State DW (greater than 10,000 mg/Kg arsenic) were associated with smelter residuals containing arsenic trioxide and flue dust and were contained within the fenced area, with the exception of a relatively small volume of material just outside the fence in the East Marine View Drive right-of-way (Figure 1-1).

No potential State DW was identified in any residential property. The materials are present over an approximate area of 1.4 acres with a total volume estimated to be approximately 10,000 to 15,000 cubic yards, of which just 100 cubic yards is present outside the fenced area in the adjacent East Marine View Drive Right-of-Way.

- The majority of materials which would be designated as federal hazardous waste were associated with the same smelter residuals discussed for DW, but with a slightly greater area of residuals and some underlying soil. These materials were also contained in the fenced area with the exception of an area adjacent to the eastern fence in the East Marine View Drive Right of Way (Figure 1-1). The materials are present over an approximate area of 2.8 acres with a total volume estimated to be approximately 20,000 to 25,000 cubic yards, of which just 600 cubic yards is present outside the fenced area in the adjacent East Marine View Drive right-of-way.

Synthetic Precipitate Leachate Testing (SPLP) demonstrated that smelter materials containing residual arsenic trioxide or flue dust can act as sources of arsenic to groundwater under ambient leaching conditions. The source characteristics of the smelter residuals is dependant on several factors, including arsenic concentration, material volume, local infiltration rates and subsurface transport pathways. Till borings drilled during the investigation found that till extends further east than previously identified. Limited testing of surface soils was performed to evaluate potential sources of arsenic to surface water. The results indicated that no additional sources were identified over those evaluated as part of the storm water/drain sediment evaluation which is being performed as a separate task under the Enforcement Order. Potential sources of arsenic to groundwater and surface water appear to be associated with smelter residual materials in the fenced area.

Three investigation programs are being performed in parallel around the former smelter area: the smelter area investigation, the lowlands investigation and the storm water and storm drain sediment controls program. Data from these investigations will be combined with pertinent data from previous investigations to provide a comprehensive understanding of environmental conditions and transport pathways in the smelter/lowlands area. This will be presented in the final supplemental lowland investigation report, scheduled to be completed in the Spring of 1999.

## **2.0 INTRODUCTION**

This report describes the findings of a sampling and chemical analysis investigation in the former smelter area at the Everett Smelter Site. The scope and intent of the investigation was provided in the Smelter Area Investigation Sampling and Analysis Plan (Asarco, 1997a) and subsequent addendum (Asarco, 1998a). The investigation was designed to fulfill the requirements specified in the Enforcement Order issued by the Washington State Department of Ecology (Ecology), as described below, and at the same time to provide data to support identification of cleanup action alternatives for the former smelter area. Soil samples were collected at 60 locations to depths up to 39 feet. Samples were analyzed for total arsenic and lead. Selected samples were also tested for leachability and toxicity. In addition, the extent of till was investigated to provide information pertaining to the evaluation of arsenic transport in groundwater.

Per the program objectives, the sampling and analyses have provided further characterization regarding the nature and extent of contamination associated with the residual materials from the smelter demolition and subsequent redevelopment of the property. The sampling and analyses provide important information not only regarding the residual contamination associated with the historical smelter footprint, but also additional detail as to whether residuals are present outside of the historical footprint, due to redevelopment. In order to address these issues, samples were collected from within the currently fenced portion of the historical smelter footprint, portions of the historical smelter footprint outside of the fenced area, and from outside the perimeter of the historical smelter footprint. Additional sampling will be performed to support final design once a cleanup action has been selected. Sampling in support of final design will address all smelter residuals, including smelter residuals located within the residential areas.

The Everett Smelter Site is located in northeast Everett, Washington and includes the former operation area of the Everett Smelter (Figure 2-1) and the surrounding area. The smelter operated from 1894 to 1912 and the structures were demolished by 1915. Remnants of foundations,

footings, flues and demolition debris from the smelter were still present when portions of the former smelter area were redeveloped for residential use in the 1930s and 1940s. During this redevelopment, smelter demolition debris appears to have been graded with some localized cut and fill for construction of roads, basements and walkways. The floors and foundations of the former smelter structures are still present in many areas in near surface soils. Construction of the road interchange of East Marine View Drive and State Route 529 in the northern portion of the former smelter operational area occurred in 1956. In the road interchange area, soils (including any residual smelter demolition debris) were excavated and used for fill under the adjacent State Route 529 overpass and Weyerhaeuser access road. This finding is based on: (1) a review of aerial photographs taken before, during and immediately after the construction; (2) comparison of smelter-era and current surveyed surface elevations; and (3) sampling data and observations from the smelter area investigation and previous investigations.

The site has been divided into two primary areas (see Figure 2-1): (1) the upland area, which includes the residential area west of East Marine View Drive; and (2) the lowland area, which includes the industrial properties at the base of the bluff east of East Marine View Drive, extending across the Weyerhaeuser East Site to the Snohomish River. The upland area has been further divided into two primary sub-areas: (1) the former smelter area, which includes footprints of the former smelter operations area and adjacent areas where residual smelter materials and debris are present; and (2) the surrounding peripheral area. A portion of the former smelter area has been purchased by Asarco and fenced off. The residential structures in this area (called the "fenced area") have been demolished and only foundations and ground-level structures remain.

Environmental conditions in the former smelter area have been investigated and an evaluation of remedial options has been performed as documented in the Remedial Investigation (RI) and Feasibility Study (FS) reports (Asarco, 1995a and 1995b). The requirements for additional characterization were specified in Enforcement Order No. DE 97TC-N119 issued by Ecology.

The objectives of the smelter area investigation, as stated in the Enforcement Order were:

"to identify the nature and extent of extremely hazardous waste, federally designated hazardous waste, state dangerous waste, and any other soils or material that may be a contaminant source for surface and groundwater in and adjacent to the smelter site. The smelter area is defined as the former smelter property east of State Route 529. Asarco shall conduct an investigation to determine the location and volumes of material in the waste categories listed above."

In addition, the investigation was performed to address data needs identified during a series of mediation meetings among Ecology, Asarco, the City of Everett, various citizens groups and other interested parties to develop and evaluate a range of remedial alternatives. These data needs were described in an addendum to the Sampling and Analysis Plan (Asarco, 1998a).

The smelter area investigation is a component of on-going site-wide investigations being performed as separate studies, including: (1) additional characterization of uplands surface water quality and arsenic sources (including the former smelter area); (2) residential soil sampling in the peripheral area; and (3) additional characterization of soil and groundwater quality in the lowland area. It should be noted that the boundaries between the peripheral area and the former smelter area are not distinct and that there is some overlap between the upland portion of the smelter site and the lowlands for the different investigations.

This report is structured as follows:

**Section 3.0 Investigation Methods.** This section presents details on how the smelter area investigation was implemented. Information on the nature and types of samples collected is provided along with methods for sample collection, handling and analysis.

**Section 4.0 Description of Former Smelter Operations and Site History.** This section presents a summary of the principal smelter operations at the site, including the technologies

employed, the locations of smelter structures, materials processed, and products, byproducts and waste materials produced. Information regarding the demolition of the smelter and subsequent land development is also presented, focusing on how residual smelter materials were moved during residential and roadway construction. This information provides the basic understanding of the site, which has directed the various sampling investigations and will be an important component in the design of cleanup actions.

**Section 5.0 Lead and Arsenic Concentrations in Soils and Smelter Residuals.** This section presents the findings of the smelter area investigation with respect to the lead and arsenic concentrations measured in soils and smelter residuals. The section is divided into subsections based on areas where specific smelter operations occurred. To put the new data into context, summary information on the former smelter operations and materials, and on post-smelter development and land use are presented along with the findings of previous investigations, such as the Remedial Investigation (RI). By this method a comprehensive evaluation of former smelter area conditions is provided including all pertinent information.

**Section 6.0 Findings of Specialized Smelter Area Evaluations.** This section describes the results of specialized smelter area evaluations performed on a subset of the samples collected. These included bioassay testing in accordance with the requirements of Chapter 173-303 WAC (Dangerous Waste Regulations). The results of this testing are used in Section 6.0 in the evaluation of the various State waste categories. While smelter residuals and soils in place cannot be described as solid wastes and therefore, are not subject to waste classification unless removed (i.e., generated), such classification is appropriate to evaluate remedial alternatives affected by land disposal restrictions and/or involving offsite disposal. Synthetic Precipitation Leach Procedure (SPLP) tests were also performed to evaluate potential source characteristics of different types of residual smelter materials. In addition, the extent of unweathered glacial till was evaluated.

**Section 7.0 Nature and Extent of Materials of Interest.** In this section, the test results from bioassay and previous TCLP testing are used to estimate total arsenic levels in soils and residual smelter materials which would be associated with different waste categories. The data for total arsenic concentration in soils generated by this and previous investigations are used to provide information about the nature and extent (volume) of the different materials of interest for waste classification, if generated, and to provide information on source characteristics.

**Section 8.0 Summary of Findings and Future Investigations.** This section provides a summary of the principal findings of the smelter area investigation. The expected scope and schedule of future investigations is also presented to provide a summary of how data will be generated to design an integrated cleanup action remedy for the former smelter area and adjacent lowlands area.

### **3.0 INVESTIGATION METHODS**

#### **3.1 SAMPLE LOCATIONS**

During the smelter area investigation soil samples were collected at 60 locations to depths up to 39 feet. The sample collection locations are shown on Figure 3-1. Samples were collected from 12 test pits, including six adjacent deeper borings (see Table 3-1); from 26 smelter area (SA) soil borings (see Table 3-2); from 16 borings and 4 surface locations in the State Route 529 overpass and interchange area (see Table 3-3); and from 4 till boring locations (see Table 3-4). As described in the SAP, soil sampling locations were grouped based on their location relative to both former smelter operations and to current site features. Discussion of the sampling results is provided in Section 5.0 subdivided into the areas described in the SAP.

#### **3.2 FIELD PROCEDURES**

Field work was conducted during March and April, 1998. Unless specified otherwise, equipment and procedures, including sampling techniques sample handling, documentation, analyses and all QA/QC procedures for data quality control were performed as specified in the RI Work Plan (Hydrometrics, 1992). Best Management Practices were employed to minimize potential impacts of the investigation on groundwater and surface water quality. These practices were consistent with those proposed in the Demolition Work Plan (Asarco, 1997b) and the Storm Water and Storm Drain Sediment Characterization and Controls Plan (Asarco, 1998b).

**TABLE 3-1  
SUMMARY OF SMELTER AREA TEST PIT AND BORE HOLE SAMPLING SITES**

Site Name	Type	Date	Depth (ft)	Sample Numbers	Location/Remarks
TP-3	Test Pit	3/20/98	6	EVT-9803-169 thru -174	Roaster Area - SE Roaster
TP-3-BH	Bore Hole	3/23/98	11	EVT-9803-175 thru -180	Adjacent to TP-3
TP-4	Test Pit	3/18/98	6	EVT-9803-112 thru -117	Processing Area - Arsenic Kitchens
TP-4-BH	Bore Hole	4/7/98	11	EVT-9804-120 thru -123	Adjacent to TP-4
TP-5	Test Pit	3/19/98	5	EVT-9803-126 thru -130	Processing Area - Arsenic Kitchens
TP-6A	Test Pit	3/18/98	6	EVT-9803-106 thru -111	Processing Area - Arsenic Kitchens
TP-6A-BH	Bore Hole	4/7/98	13	EVT-9804-115 thru -119	Adjacent to TP-6A
TP-6B	Test Pit	3/18/98	6	EVT-9803-100 thru -105	Processing Area - Flue Structure
TP-7	Test Pit	3/19/98	6	EVT-9803-132 thru -137	Processing Area - Dust Chambers
TP-7-BH	Bore Hole	4/6/98	11	EVT-9804-105 thru -108	Adjacent to TP-7
TP-8	Test Pit	3/19/98	6	EVT-9803-138 thru -143	Processing Area - Dust Chambers
TP-9	Test Pit	3/18/98	6	EVT-9803-119 thru -124	Processing Area - Dust Chambers
TP-10A	Test Pit	3/20/98	6	EVT-9803-153 thru -168	Stack Area - Flue Structure
TP-10B	Test Pit	3/20/98	6	EVT-9803-156 thru -161	Stack Area - Flue Structure
TP-10B-BH	Bore Hole	4/6/98	11	EVT-9804-100 thru 103	Adjacent to TP-10B
TP-11A	Test Pit	3/19/98	5	EVT-9803-151 thru -155	Stack Area - Flue Structure
TP-11B	Test Pit	3/19/98	6	EVT-9803-145 thru -150	Stack Area - Flue Structure
TP-11-BH	Bore Hole	4/7/98	13.5	EVT-9804-109 thru -113	Adjacent to TP-11

**TABLE 3-2**  
**SUMMARY OF SMELTER AREA SOIL BORING SAMPLING SITES**

Site Name	Type	Date	Depth (ft)	Sample Numbers	Location/Remarks
SA-1	HSA/Split Spoon	3/23/98	6.25	EVT-9803-363 thru -368	Roasting Area - Dust Chambers
SA-2	HSA/Split Spoon	3/23/98	7	EVT-9803-369 thru -374	Roasting Area - Dust Chambers
SA-3	Split Spoon	3/26/98	4	EVT-9803-431 thru -434	Roasting Area - Ore Shed
SA-4	Split Spoon	3/25/98	6	EVT-9803-391 thru -396	Roasting Area - SW Part
SA-5	HSA/Split Spoon	3/23/98	15	EVT-9803-376 thru -384	Blast Furnace/Lead Refining Area
SA-6	HSA/Split Spoon	3/20/98	9	EVT-9803-353 thru -361	Arsenic Process Area - Ovens
SA-7	HSA/Split Spoon	3/19/98	11	EVT-9803-344 thru -352	Arsenic Process Area Storage Bin
SA-8	Split Spoon	3/18/98	5	EVT-9803-305 thru -309	South of Arsenic Process Area
SA-9	Split Spoon	3/18/98	5	EVT-9803-300 thru -304	South of Arsenic Process Area
SA-10	Split Spoon	3/19/98	5	EVT-9803-325B thru -330	South of Arsenic Process Area
SA-11	Split Spoon	3/18/98	5	EVT-9803-310 thru -314	South of Arsenic Process Area
SA-12	Split Spoon	3/19/98	5	EVT-9803-339 thru -343	South of Arsenic Process Area
SA-13	Split Spoon	3/25/98	4	EVT-9803-414 thru -419	Stack Area
SA-14	Split Spoon	3/23/98	5	EVT-9803-385 thru -389	Stack Area
SA-15	Split Spoon	3/25/98	5	EVT-9803-398 thru -402	Stack Area
SA-16	Split Spoon	3/25/98	5	EVT-9803-408 thru -412	Stack Area
SA-17	Split Spoon	3/25/98	5	EVT-9803-403 thru -407	Stack Area
SA-18	Split Spoon	3/25/98	5	EVT-9803-420 thru -424	Stack Area
SA-19	Split Spoon	3/30/98	5	EVT-9803-453 thru -458	Medora Way
SA-20	Split Spoon	3/30/98	5	EVT-9803-448 thru -452	Medora Way
SA-21	Split Spoon	3/30/98	5	EVT-9803-444A thru -447A	Whitehorse Trail
SA-22	Split Spoon	4/8/98	5	EVT-9804-306 thru -310	Medora Way
SA-23	Split Spoon	3/26/98	5	EVT-9803-425 thru -429	SR 529 Median
SA-24	Split Spoon	4/1/98	5	EVT-9804-300 thru -304	East Marine View Drive
SA-25	Split Spoon	3/18/98	5	EVT-9803-315 thru -320	South of Arsenic Process Area
SA-26	Split Spoon	3/19/98	5	EVT-9803-321 thru -325A	South of Arsenic Process Area

**SUMMARY OF SR-529 HIGHWAY INTERCHANGE SAMPLING SITES  
AND SOUTHERN CLOVERLEAF SURFACE SAMPLES**

Site Name	Type	Date	Depth (ft)	Sample Numbers	Location/Remarks
HA-1	Split Spoon	4/8/98	4.5	EVT-9804-329 thru -332	North Side
HA-2	Split Spoon	4/9/98	4.5	EVT-9804-373 thru -376	North Side
HA-3	Split Spoon	4/9/98	4.5	EVT-9804-345 thru -348	Central Median
HA-4	Split Spoon	4/8/98	4.5	EVT-9804-312 thru -315	South Side
HA-5	Split Spoon	4/8/98	4.5	EVT-9804-333 thru -336	North Side
HA-6	Split Spoon	4/9/98	4.5	EVT-9804-369 thru -372	North Side
HA-7	Split Spoon	4/9/98	2.5	EVT-9804-349 thru -351	Central Median
HA-8	Split Spoon	4/8/98	4.5	EVT-9804-316 thru -319	South Side
HA-9	Split Spoon	4/8/98	4.5	EVT-9804-337 thru -340	North Side
HA-10	Split Spoon	4/9/98	4.5	EVT-9804-365 thru -368	North Side
HA-11	Split Spoon	4/9/98	4.5	EVT-9804-353 thru -356	Central Median
HA-12	Split Spoon	4/8/98	4.5	EVT-9804-320 thru -323	South Side
HA-13	Split Spoon	4/8/98	4.5	EVT-9804-341 thru -344	North Side
HA-14	Split Spoon	4/9/98	4.5	EVT-9804-361 thru -364	North Side
HA-15	Split Spoon	4/9/98	4.5	EVT-9804-357 thru -360	Central Median
HA-16	Split Spoon	4/8/98	4.5	EVT-9804-324 thru -327	South Side
SCL	Surface Grab	4/3/98	0	EVT-9804-600	Field Sample #1
SCL	Surface Grab	4/3/98	0	EVT-9804-601	Field Sample #2
SCL	Surface Grab	4/3/98	0	EVT-9804-602	Field Sample #3
SCL	Surface Grab	4/3/98	0	EVT-9804-603	Field Sample #4

**TABLE 3-4**  
**SUMMARY OF TILL BORING SAMPLING SITES**

Site Name	Type	Date	Depth (ft)	Sample Numbers	Location/Remarks
TB-1	HSA/Split Spoon	4/1/98	36.5	EVT-9804-519 thru -527	East Marine View Drive
TB-2	HSA/Split Spoon	3/31/98	36.5	EVT-9803-511 thru -518	East Marine View Drive
TB-3	HSA/Split Spoon	3/31/98	39	EVT-9803-500 thru -510	East Marine View Drive
TB-4	HSA/Split Spoon	4/2/98	91.5	None	Stack Area

Field procedures used in the smelter area investigation are described below:

### Test Pit Excavation

All test pits were excavated during periods of dry weather to avoid storm water management concerns. Plywood was used to cover unpaved ground in the area where the backhoe was working to minimize soil disturbance. Sod was removed from the footprint areas of test pits prior to excavation. The test pits were excavated using a rubber tired backhoe. Soils were stockpiled on tarps during excavation. The test pits were excavated to a depth of approximately 6 feet or until dense unweathered till was encountered.

Soils and hydrologic conditions in test pits were logged in field by a hydrogeologist. Soil samples were collected from the test pit walls at 1 foot intervals, compositing soils over each interval with a trowel and stainless steel bowl. Soil borings were completed adjacent to the test pits where samples from depths greater than 6 feet were required. Rapid reporting of data by the analytical lab allowed for deeper samples to be collected by soil boring at test pit locations where the 5 to 6 foot samples (the deepest safe depth for a test pit) contained relatively high concentrations of arsenic. The SAP also called for collection of groundwater samples from test pits if shallow groundwater was encountered. No groundwater was encountered at any of the test pit locations. Photos and video footage were taken of each test pit for further documentation. The photo log is included as Appendix A and the lithology logs are included as Appendix B.

Upon completion of sampling, the original soils were used to backfill the test pits in the approximate order they were removed. After the test pits were backfilled, the original sod, if available, was used to cover exposed soils and a cement marker with an aluminum ID tag was placed at each test pit to mark its location. Plastic sheeting was used to temporarily cover any areas of exposed soils until they were hydroseeded. No excess soil remained after backfilling.

All equipment was cleaned between test pit to prevent tracking of soils outside of the designated work area.

### Shallow Soil Borings

Shallow soil borings were advanced with either a Piper 2000 truck mounted drill rig using 2 ¼" ID hollow-stem auger and standard split spoon sampler, or a portable Acker drill rig driving continuous split spoon samples. Soils were logged in the field by a hydrogeologist. Samples were collected for XRF analysis at 1 foot intervals using a 3-inch outside diameter split spoon sampler with a 140 lb safety hammer and a 30-inch drop. Samples from the overpass area were collected at intervals of 0-6", 6"-1 ft, 2 ft-2.5 ft and 4 ft-4.5 ft. The split spoon sampler was washed between samples using an Alconox solution and a fresh water rinse. Upon completion of the borings, the holes were backfilled with bentonite chips. Borings inside the fenced properties and in City streets were completed with a one foot concrete surface seal with an aluminum ID tag. Borings in residential yards were backfilled with potting soil and topped with the grass cap saved during sampling. Lithologic logs are included as Appendix B.

### Deep Till Borings

The shallow and deep till borings were completed with a Mobile Drill B-61 drill rig using 4 ¼ inch inside diameter hollow stem augers. Samples were obtained for XRF analysis at TB-1, TB-2 and TB-3 at depths of 0, 2 ft, 5 ft and at 5 foot intervals thereafter with a 2-inch split spoon under a 140 pound 30 inch drop winch release safety hammer. Soil samples were collected from the deep till boring at TB-4 at 5 to 10 foot intervals for lithologic description only. Lithologic logs are included in Appendix B.

## **Sample Description and Handling**

Soil samples were examined and described in the field for lithology, color, grain size, texture, moisture content and evidence of smelter debris. The samples were placed in one-gallon size zip-lock bags and marked with the sample number, the date and time of sample collection. Sample number, date, time and sample depth were also recorded in a field log. A table with summary information on the soil samples collected, including their location, depth, stratigraphic unit and analytical results is in Appendix C.

### **3.3 ANALYTICAL METHODS**

All soil samples collected during this investigation were analyzed for arsenic and lead by Hydrometrics' Ruston, Washington Laboratory using x-ray fluorescence (XRF) with a fundamental parameters calibration except for 4 samples. Those four samples were analyzed by wet chemistry at Asarco's Technical Services Laboratory in Salt Lake City, Utah rather than XRF due to presence of asphalt which could not be prepared at the Ruston laboratory. Total sample numbers collected for arsenic and lead analyses were 366, of which 27 were field duplicates (see Appendix C). The accuracy of the XRF analyses was confirmed by wet chemistry analysis of 8 confirmation samples.

Four split samples were analyzed using synthetic precipitation leaching procedures (SPLP) at Asarco's Technical Services Laboratory in Salt Lake City, Utah. Ten split samples were also analyzed at a commercial laboratory, Parametrix, for bioassays.

All analytical results including data comparison of XRF and confirmation results are in Appendix D.

## **4.0 DESCRIPTION OF FORMER SMELTER OPERATIONS AND SITE HISTORY**

This section provides a summary of the principal operations at the Everett smelter, smelter closure and demolition and subsequent site redevelopment. The summary of the smelter has been developed from documented descriptions from the period of Everett operations, and from comparisons with standard smelter operational procedures from the same era. Descriptions of subsequent land use has been generated from a variety of documentary sources and a series of aerial photographs of the site beginning in 1941. The intent of this summary is to provide background to aid in the understanding of current site conditions, thereby allowing for a more effective and focused identification and evaluation of remedial alternatives.

### **4.1 FORMER SMELTER OPERATIONS**

The Everett smelter was constructed to process ore to produce lead bullion and Dore' bars (lead containing relatively high levels of gold and silver). A general process schematic for the smelter is shown as Figure 4-1. The former layout of the smelter operational area is shown on Figure 4-2.

Lead ore was brought in by rail car and separated based on its sulfur content. Ores with high levels of sulfur were roasted prior to processing in the blast furnaces. Roasting the ore in an oxidizing environment released sulfur in the form of gaseous sulfur dioxide. The off-gases from the roasting process were conveyed by above- and below-ground brick flues via the arsenic process dust chambers to the adjacent smoke stacks. One of the byproducts of roasting was the release of arsenic from the ore as dust (termed "flue dust") which was carried with the off gases in the brick flues. The flue dust was collected in the arsenic process dust chambers and transferred to the arsenic processing area for feed material in the production of arsenic trioxide.

Specific descriptions of arsenic processing operations have not been located for the Everett smelter. However, based on the layout of the operations and flue connections, and similar types

of smelter operations from the same time period the main operations appear to be as follows. Overall, the process manufactured a high quality arsenic product (arsenic trioxide containing around 760,000 mg/Kg arsenic) from roasting plant flue dust (based on sampling data containing around 25,000 mg/Kg arsenic). Roasting plant flue dust was most likely conveyed to the storage bin attached to the mill (Figure 4-2). At the mill, flue dust may have been combined with fluxes to increase product yield. After milling, the flue dust would have been roasted in the arsenic oven. This roasting would release arsenic gas, which was sent to one of the two arsenic kitchens. Arsenic kitchens were typically zigzag flues in which, because of cooling and the friction between the walls and the traveling gas, arsenic trioxide dust particles were precipitated and collected at the bottom of each cell. The arsenic trioxide product was stored in bins prior to transportation for sale offsite.

The blast furnaces (Figure 4-2) separated out lead from ore by smelting in a chemically reducing environment. Raw oxide ore and roasted sulfide ore were fed to the blast furnaces with coke, lime and smaller amounts of other fluxes depending on the specific ore characteristics. The mixture was smelted to produce lead bullion, matte and slag, which separated due to their different densities. Matte is typically comprised of metal sulfides and is relatively high in copper. Lead content (around 20% on average) was sufficient for the matte to be recycled to the roasting plant (Braden, 1899). Slag is an amorphous, vitrified material and was the largest byproduct of the smelting process by volume. Slag was disposed onsite. Lead bullion was the primary product from the blast furnaces. The lead bullion was sent to the refining operation, which further separated out material containing relatively high amounts of gold and silver (called Dore' bars).

The blast furnaces generated off gases which were conveyed via an above-ground brick flue to the smoke stack in the center of the facility. The off gases contained flue dust, with relatively high levels of arsenic. The flue dust was settled out from the air stream in the blast furnace dust chamber (see Figure 4-2) and returned to the blast furnaces. It was typical smelter practice in this time period to mix the flue dust with lime prior to recycling (Collins, 1899).

In summary, historical information regarding the smelter operations and associated facilities formed the basis for accurately identifying the location of footprints of the former operations with respect to current site features. This information was used to direct the sampling activities performed in the smelter area investigation.

#### 4.2 CHARACTERISTICS OF MATERIALS PROCESSED/GENERATED BY THE FORMER SMELTER OPERATION

Based on the data generated by this and previous investigations, information on historical smelter operations, and findings for other lead smelter sites, elevated levels of arsenic and lead in the former smelter operations area at the Everett Smelter Site appear to be attributable to the presence of residuals of the following materials:

- **Ore.** A variety of lead and arsenic ores were processed by the Everett smelter. A report on the smelter (Braden, 1899) stated that the principal ore being processed at that time contained 2 to 5 % lead (20,000 to 50,000 mg/Kg), which is in the low range for ores from the northwest (Hofman, 1918).
- **Roasting Plant Flue Dust.** Based on data generated by this investigation Roasting Plant flue dust appeared to contain around 25,000 mg/Kg arsenic and less than 100 mg/Kg lead. Due to the oxidizing nature of the roasting process, metals in flue dust were typically present as oxides/sulfates.
- **Blast Furnace Products/Byproducts.**
  - **Matte:** Typically comprised of metal sulfides, with iron being the dominant metal. Matte was recycled to the roasting plant. Historical information (Braden, 1899) indicated that the character of the matte produced was variable and in 1898 averaged 20% lead and 15% copper. Arsenic levels are typically low in matte, relative to the ore (Hofman, 1918).
  - **Slag:** Slag is an amorphous, vitrified furnace product and the primary byproduct of the smelting process. RI data indicate that the slag contained an average lead content of 8,700 mg/Kg (ranging upward to 21,600 mg/Kg) and an average arsenic content of 490 mg/Kg (ranging up to 2,200 mg/Kg).

Significant release of metals from the glassy matrix of slag does not usually occur under normal environmental conditions.

- **Blast Furnace Flue Dust:** Only two samples associated with the former blast furnace flues were collected in previous investigations. Arsenic concentrations of 11,810 and 12,000 mg/Kg were measured in these samples. At other lead smelter sites, arsenic concentrations have been found to be similar in blast furnace and roasting flue dust. In addition, the chemical form has been found to be similar. Typically, blast furnace flue dust would have contained reduced compounds such as sulfide, however, weathering has been found to result in oxidation to sulfates and oxides, such that the two materials are almost indistinguishable from a chemistry perspective. However, the blast furnace and roasting flue dusts were generated and handled in separate areas at Everett and are distinguishable on a location basis.
- **Arsenic Trioxide.** Pure arsenic trioxide product from the smelter was found at the site during the RI and was also observed in subsurface soils at one location during this investigation. Arsenic content of the material, which is a white crystalline powder, is around 760,000 mg/Kg (76%).

#### 4.3 SMELTER DEMOLITION AND SUBSEQUENT LAND USE

The lead ingot production portion of the Everett smelter operation ceased in February 1908. The arsenic processing portion continued to operate intermittently until February 1912 as part of cleanup operations for arsenical dusts from the smelting operation. Dismantling of the smelter began immediately after shutdown, with much of the machinery taken to Tacoma for use in construction of a new facility. Based on observations made during this investigation, it appears that structures, such as brick flues, were demolished with debris being spread within the structure footprint and in the immediate vicinity. Typically floors and foundations appear to have been left in place. In addition, documentary evidence indicates that the stacks were toppled in 1915 for salvage of bricks, and two years later some buildings were relocated to the Norwegian-Pacific shipyards to house machinery.

The property was dormant for several years until it was sold through a series of transactions in the 1920s. Homes were built on the smelter site through the 1930s and 1940s and these areas have remained residential ever since. During construction of these houses it appears that localized cut and fill activities took place to provide terracing for the houses and gardens and during excavation of basements. Recently residences located in and adjacent to the former arsenic processing area were purchased by Asarco. The majority of these residences were located within the fenced area to the south of State Route 529 (Figure 4-2). The superstructures in the fenced area were demolished in the Fall of 1997. Floors and foundations of the former smelter structures are intact below current ground surface at certain locations, although they are sometimes discontinuous due to the small scale cut and fill activities which occurred during residential development.

A major road interchange of East Marine View Drive and State Route 529 was constructed in 1956 covering a significant portion of the former smelter site. Activities during construction were evaluated through a variety of information sources. Aerial photographs of the area were taken before, during and immediately after construction, which show the large scale cut and fill activities. In addition, a topographical map of the former smelter area from 1913 was compared with current ground elevations to identify the major areas of cut and fill. Finally, observations of materials and results of the various investigations were considered. Based on this overall evaluation, it was found that this area (called the "cloverleaf" area) had several feet of soil removed during the interchange construction. This excavation appears to have removed all residual smelter material. The excavated materials appear to have been used for fill beneath the south-bound lane of State Route 529 and for the Weyerhaeuser access road.

## **5.0 SUMMARY OF LEAD AND ARSENIC CONCENTRATIONS IN FORMER SMELTER AREA SOILS**

This section provides an evaluation of current conditions in the former smelter area with respect to lead and arsenic concentrations in soils and residual smelter materials. Information on historical smelter operations, demolition and subsequent land use has been integrated with the findings of previous studies (such as the RI and associated investigations) and the findings of the smelter area investigation. By this approach, a comprehensive description of the current smelter area conditions is provided. Data from the recent smelter area investigation and from previous investigations are presented in Appendix G.

Consistent with the SAP, for the purposes of investigation and evaluation, the former smelter area has been divided into subareas (Figures 5-1 through 5-6) based on smelter operations and subsequent land use as follows:

- the former roasting operations area;
- the former blast furnace/lead refining area;
- the former arsenic processing area;
- the general area of the former stacks;
- the former northern smelter area;
- the State Route 529 Overpass Area; and
- the slag pile area.

As discussed in the SAP, no additional sampling was proposed in the slag pile area during the recent smelter area investigation. The majority of the slag pile area is outside the boundary of the former smelter area and in previous studies has been evaluated primarily as part of lowland area investigations. Additional characterization of the slag pile area, including fill material beneath the Weyerhaeuser access road will occur during the upcoming lowland investigation (Asarco, 1998c).

## 5.1 FORMER ROASTING OPERATIONS AREA

### 5.1.1 Description of Former Smelter Operations, Demolition and Subsequent Land Use

Ores containing high levels of sulfur were roasted prior to smelting. The roasting process oxidized sulfides to sulfur dioxide, which was released as a gas and vented, through above- and below-ground brick flues, via the arsenic process dust chambers to the adjacent smoke stacks. The roasting process also resulted in the release of arsenic in the form of flue dust. The flue dust was conveyed through the brick flues and settled out in the arsenic dust chambers. Here it was collected and transported to the arsenic processing area for use as feed material (see Section 5.3.1).

When smelter operations ceased at Everett, the roasters were dismantled and taken to the Tacoma smelter. The above ground brick flues appear to have been demolished with the brick debris being spread in the flue footprint and the adjacent area. Below ground flues were left intact.

A large portion of the former roasting operations area is within the existing road interchange of East Marine View Drive and State Route 529 (the "cloverleaf" area). Soils and associated smelter materials were removed from this area during construction of the interchange in 1956. The southern portion of the roasting operations area is within the currently fenced area. In this area, the foundations and floors of smelter flues and other structures are typically present below the current ground surface. In addition, a portion of an underground smelter flue is completely intact in the subsurface. Some smelter materials were moved about during localized cut and fill activities, such as terracing and excavation for basements, during residential development in the 1930s and 1940s.

### 5.1.2 Findings of Previous Investigations in the Roasting Operations Area

A total of thirteen locations were investigated including five surface samples in the former roasting operations area during previous subsurface soil sampling activities (Figure 5-1). These sampling activities were performed prior to and during the RI. Data collected prior to the RI typically have a "SAIC" notation. At some locations, samples were collected both during the RI and pre-RI. Data are presented from both investigations in this report.

Two soil borings were located within the existing cloverleaf portion of the former roasting operations area. Smelter-related material was not found at either location (Tables 5-1 and 5-2). This finding is consistent with the removal of soils including smelter materials from the cloverleaf area during the construction of the road interchange.

Samples were collected at seven locations in the former roasting operations area within the currently fenced area. Within the footprint of the southern roaster building (Table 5-3), smelter materials, including demolition debris were identified to a depth of four feet. Arsenic concentrations indicate that residual flue dust is mixed with the debris.

At a location immediately adjacent to the footprint of a former above-ground flue, arsenic concentrations (Table 5-4) indicate the presence of flue dust residuals between two and three feet.

At two locations to the east of the footprint of a former above-ground flue, arsenic concentrations (Table 5-5) indicate the presence of flue dust residuals at about a 2-foot depth. The arsenic concentrations are lower than measured at locations S-3/SAIC-S3 and S-4/SAIC-S4, discussed above, and may represent levels related to deposition of air emissions during smelter operations with subsequent cut and fill activities modifying the soil profile. Demolition debris containing small amounts of residual flue dust compared to the footprint areas may also be present.

In addition, samples were collected at two locations to the west of the footprint of the former flue. At location S-22/SAIC-S22 (Table 5-6) the arsenic concentrations indicate flue dust mixed with other material is present to a depth of two feet. No sample descriptions were recorded in the pre-RI and therefore it is not certain whether demolition debris is present in this area. To the south, at location S-24, arsenic concentrations do not indicate the presence of smelter material (Table 5-7). Five surface samples were collected in the roasting operations area during previous studies (Table 5-110). As discussed in the SAP, surface samples do not provide information on material volumes, however, the data are included in this report for completeness.

#### 5.1.3 Findings of the Recent Smelter Area Investigation - Roasting Operations Area

Soil samples were collected at five locations in the former roasting operations area during the recent smelter area investigation (Figure 5-1). Samples were collected at one location within the footprint of the former roasting operations smoke stack (SA-1) through the current surface of Pilchuck Path. Smelter debris was present to a depth of four feet with the intact stack foundation present below this (Table 5-8). Lead and arsenic concentrations in the debris were consistent with the presence of residual roasting operations flue dust.

Samples were collected within the former roasting operations flue footprint to the south of the former roasting operations stack area. The location (SA-2) was on the current surface of Pilchuck Path. The sample descriptions and lead and arsenic concentrations (Table 5-9) indicate that a one-foot thick layer of smelter debris containing residual flue dust is present one foot below current ground surface. Migration of arsenic from the smelter material to the underlying soil has occurred, however, arsenic concentrations attenuate rapidly with depth.

A test pit was excavated through the footprint of the former flue in the southern portion of the roasting operations area. The underground flue was found intact, approximately 2 to 4 feet below current ground surface. The location and nature of this flue was expected based on maps of the

historical smelter layout. The flue was full of grey sand with yellow staining, which based on appearance and arsenic concentrations (Table 5-10), is identified to be roasting operations flue dust. A surface soil sample was collected in the adjacent cloverleaf embankment in the area where the flue was expected to daylight. The arsenic concentration in this sample was 18 mg/Kg and the lead concentration was 35 mg/Kg. These results indicate that the embankment in the vicinity of the below ground former smelter flue is not a significant source of arsenic to surface water.

Samples were collected at one location uphill from the footprint of the former roasting operations, just inside the fenced area (location SA-4). Smelter material including demolition debris was identified in the upper two feet of soils (Table 5-11). Given that this location is somewhat distant from the footprint of the former roasting plant and uphill, it appears likely that the demolition debris was placed as fill during grading activities for residential activities or during construction of the adjacent cloverleaf (earth moving activities as part of the road interchange construction occurred within a few feet of this location). Significant migration of arsenic to underlying soils has not occurred at this location.

One soil boring was drilled within the footprint of the former ore shed to evaluate the presence of smelter materials. Lead concentrations and material descriptions (Table 5-12) indicate that residual smelter materials are present in the upper foot of soil. Based on the relatively high lead concentration compared to arsenic, it is likely that the residual material is lead ore, which was the principal raw material for the smelting process and stored in the ore shed.

#### 5.1.4 Summary of Current Conditions in the Roasting Operations Area

The smelter material of interest with respect to the former roaster operations area is flue dust, which was generated by the roasting process and conveyed by brick flues to the dust chambers and smoke stacks. Samples of flue dust collected from an intact underground flue in the northern portion of the fenced area contained arsenic concentrations of approximately 21,500 and 28,500

mg/Kg arsenic and 89 and 51 mg/Kg lead. At other locations within the fenced area, foundations and floors of former underground flue structures and of the former smoke stack were found to be intact about two feet below current ground surface. The floors and foundations are typically overlaid by debris from the demolition of structures. Based on arsenic concentrations, this material contains residual flue dust. The demolition debris extends to the areas immediately adjacent to the former footprints. In particular, debris is present up to depths of about four feet in the area between Pilchuck Path, 5th Street and the edge of the fenced area adjacent to the cloverleaf.

To the north of the fenced area in the cloverleaf previous sampling investigations indicated that soils and smelter materials were removed during the construction of the road interchange. An additional sample collected in this investigation indicated that small amounts of residual lead ore are present in surface soils in the vicinity of the former ore shed. The footprint of the former ore shed is within the cloverleaf area towards the eastern edge.

## 5.2 FORMER BLAST FURNACE/LEAD REFINING OPERATIONS AREA

### 5.2.1 Description of Former Smelter Operations, Demolition and Subsequent Land Use

Raw lead ore was processed in the blast furnace to separate out molten lead, matte (a relatively high lead content material) and slag. Lead was sent to the refining operation to separate out gold and silver. Matte was recycled to the roasting operations and slag was disposed onsite. The blast furnace operation also generated off gases containing flue dust. The flue dust was dampened out in a brick flue system and recycled to the blast furnace. Off gases were emitted to the air via a brick stack.

The majority of the former blast furnace/refining operations area is located within the cloverleaf area. As discussed in Section 4.3, soils were removed from this area during construction in 1956

and used as fill in adjacent areas associated with State Route 529 and the Weyerhaeuser access road. Some of the former structure footprints are located in the northeast corner of the fenced area (Figure 5-2).

#### 5.2.2 Findings of Previous Investigations in the Blast Furnace/Lead Refining Area

A total of ten borings and seven surface sample locations were investigated in the former blast furnace/refining operations area during previous soil sampling activities (Figure 5-2). These sampling activities were performed prior to and during the RI.

A soil boring located adjacent to the footprint of the former blast furnace flue within the fenced area found soil mixed with residual flue dust from 2 to 3.5 feet (Table 5-14). Transport of arsenic to underlying soils has also occurred.

A test pit installed at the location of the former blast furnace flue (Figure 5-2) inside the fenced area found the flue structure partially intact approximately three to four feet below ground surface. The flue structure had a white substance on the flue interior, which contained 12,000 mg/Kg arsenic.

One location, approximately 45 feet south of the former flue footprint but within the fenced area was sampled during the pre-RI. The arsenic concentrations (Table 5-15) do not indicate the presence of smelter material containing significant residuals of flue dust.

Seven soil borings were installed within or adjacent to the footprint of the former blast furnace/lead refining buildings within the cloverleaf area (Tables 5-16 through 5-22). Except for at one location, B-3, no demolition debris was identified in this area. At location B-3 arsenic concentrations indicated that some residual flue dust was present and the presence of demolition debris was noted in the sample description.

One soil boring (T-6) was located in the vicinity of the footprint of the former arsenic storage building during the smelter area investigation. The arsenic concentrations (Table 5-23) do not indicate the presence of any smelter material or associated debris. Another boring at location T-7 was sampled in the vicinity of the footprint of the former flue in the southern portion of the area (Table 5-23). One soil boring at location B-4 within the footprint of the former arsenic storage building was sampled during the pre-RI. The arsenic concentrations (Table 5-24) do not indicate the presence of smelter material containing significant residuals of flue dust at this location.

Seven surface samples were collected in the blast furnace/lead refining operations area during previous investigations. The results of the surface samples in this area are shown in Table 5-111.

### 5.2.3 Findings of the Recent Smelter Area Investigation - Blast Furnace/Lead Refining Area

Soil samples were collected at four locations in the former blast furnace/refining operations area during the recent smelter area investigation (Figure 5-2). At location SA-23, within the footprint of the former arsenic storage building in the current cloverleaf area, arsenic and lead concentrations (Table 5-25) do not indicate the presence of residual smelter material. This is consistent with the overall finding that soils and smelter materials were removed from the cloverleaf area during the construction of the interchange.

Soil samples were collected from beneath East Marine View Drive within the footprint of the former lead warehouse. Sample descriptions and arsenic/lead concentrations indicate that residual smelter material is not present at this location. This location appears to be part of the area excavated during road construction activities.

Soil samples were collected immediately east of East Marine View Drive, downgradient from the footprint of the former blast furnace flue structures. Sample descriptions and arsenic/lead

concentrations (Table 5-26) indicate that smelter material is not present in the upper few feet of soil.

A soil boring located within the footprint of the former blast furnace smoke stack (Table 5-28) found the foundation of the former stack intact from one to six feet below current ground surface. Arsenic concentrations in the brick foundation were lower than measured in the overlaying demolition debris.

Three surface soil samples were collected in the cloverleaf area as part of the blast furnace/lead refining area evaluation to evaluate the potential to contribute arsenic to storm water. Samples SS-1, -2 and -3 were collected in areas of bare soil, which may contribute sediment to storm water runoff. The results (Table 5-29) did not indicate the presence of smelter residuals or other materials which would be a significant source to storm water.

#### 5.2.4 Summary of Conditions in the Blast Furnace/Lead Refining Area

A large portion of the former blast furnace/lead refining area is located within the current cloverleaf area. In this area soils were excavated in 1956 when the road interchange was constructed. Sampling in the cloverleaf area confirms that smelter materials were removed during construction excavation. A few pockets containing small amounts of residual smelter materials have been identified in the cloverleaf area. Surface soil samples collected from areas of bare soil did not identify materials which have the potential to act as significant sources of arsenic to surface water runoff. Historical information and sampling data indicate that the excavated soils were used as fill in the area of the Weyerhaeuser access road and the State Route 529 Overpass. Arsenic concentrations in this material typically are substantially lower than in residuals in the fenced area, probably due to mixing of smelter residuals with a relatively large amount of soil during cut and fill activities (see Section 5.6).

A small portion of the former blast furnace area is located within the fenced area. In this area the foundations and floors of former flues and the smoke stack are present beginning about one foot below current ground surface. Residual flue dust is present within the footprint of the former flue and in the immediately adjacent area associated with demolition debris from the flue (less than 50 feet from the footprint, based on sampling data).

### 5.3 FORMER ARSENIC PROCESSING OPERATIONS AREA

#### 5.3.1 Description of Former Smelter Operations, Demolition and Subsequent Land Use

The arsenic processing operations produced relatively pure arsenic trioxide using roasting operations flue dust as the primary feed material. Roasting operations flue dust was collected, milled with fluxes and roasted in the arsenic oven to generate relatively pure arsenic trioxide gas. The gas was conveyed to the arsenic kitchens in above-ground brick flues. At the kitchens, the arsenic trioxide dust was settled out, removed and stored in bins prior to transportation offsite. The location of these former operations with respect to current site features are shown on Figure 5-3. The former arsenic processing area is within the current fenced area.

Subsequent to smelter operations, it appears that structures were demolished, with brick debris being spread in the immediate area. Houses were built on the area in the 1930s and 1940s and the use has been residential ever since. Localized cut and fill activities appeared to have occurred as part of residential development, particularly during terracing and during excavation of basements, walkways and driveways. Foundations and floors of former smelter structures are intact below the surface in many locations.

### 5.3.2 Findings of Previous Investigations in the Arsenic Processing Area

Soil samples were collected at twenty-three locations including seven surface samples in the former arsenic processing area during previous investigations (Figure 5-3). These sampling activities were performed prior to and during the RI.

One soil boring (S-111) was located within the footprint of the former arsenic storage bin (Table 5-30). The arsenic concentrations indicate that arsenic trioxide residual is present from one to three feet below ground surface. The arsenic trioxide residual is associated with bricks from demolition of the smelter structures. In addition, arsenic has been transported from the smelter materials to underlying soils, to depths greater than 11 feet below ground surface.

One soil boring (SAIC-S17) was located within the footprint of the former arsenic kitchens during the Pre-RI (Table 5-31). The kitchens collected arsenic trioxide. The arsenic concentrations indicate the presence of residual smelter materials, although the concentrations are considerably lower than measured in adjacent areas and lower than would indicate the presence of significant quantities of arsenic trioxide residuals. It is noted that the sampling did not delineate the vertical extent of arsenic concentrations.

Two soil borings were located within the footprint of the former flues from the arsenic oven to the kitchens. The flues conveyed gases containing arsenic trioxide dust. The results for the flue to the southern kitchen (Table 5-32) indicate the presence of smelter material containing residual arsenic trioxide. Bricks from the demolition of the flue are present at a depth of four feet below ground surface (the deepest sample collected) and the sample description indicates that intact smelter foundations or structures may be present immediately below this depth. The results within the footprint of the former flue to the northern kitchen (Table 5-33) indicate that smelter demolition debris including residual arsenic trioxide are present within the upper two feet of soil. Transport of arsenic to deeper soils has also occurred.

A second soil boring was located between the footprints of the former southern and northern arsenic kitchens (Table 5-34). The results indicate that small amounts of arsenic trioxide residuals (relative to adjacent areas) mixed with soil and demolition debris are present to a depth of approximately four feet. It appears that smelter material is primarily present due to demolition of the kitchens and spreading of the debris, including low levels of residual arsenic trioxide, in the immediate area. However, the arsenic concentrations in these soils are much lower than in residuals within the adjacent footprint area.

A soil boring was located approximately 60 feet to the east of the former arsenic oven footprint (Table 5-35). The arsenic concentrations indicate the presence of smelter material including residual arsenic trioxide or flue dust in the upper three feet. These findings are consistent with the majority of demolition debris having been spread downhill, to the east.

Three soil borings were located within the general footprint of the former arsenic process dust chambers. The dust chambers collected flue dust from the roasting operations. The results indicate that smelter demolition debris is present in certain areas to a depth of four feet (Tables 5-36 and 5-37). Based on the arsenic concentrations, the debris appears to be associated with flue dust residuals from the dust chamber operation. It is noted that the arsenic concentrations in this area where flue dust was collected are considerably lower than concentrations in areas where arsenic trioxide was produced and handled, as discussed above. Flue dust residuals are also present in immediately adjacent soils (Table 5-38). Transport of arsenic from smelter materials to immediately underlying soils has also occurred.

One soil boring was located adjacent to the footprint of the former flue from the arsenic dust chambers to the smoke stacks. The flue conveyed off gases containing flue dust. The results (Table 5-39) indicate that smelter material containing residual flue dust is present.

Five soil borings were located adjacent to the former arsenic dust chambers. Samples S-10, S-11, and S-12 were collected approximately 20 to 30 feet from the western edge of the former dust chambers. Arsenic concentrations at the locations in this area (Table 5-40) do not indicate that debris or residual flue dust is present. These findings are consistent with the demolition debris from the dust chambers being spread downhill to the southeast.

Sampling locations S-46 and S-47 were located to the east of the footprint of the former arsenic dust chambers. Location S-47 was approximately 50 feet from the footprint and location S-46 was approximately 120 feet from the footprint. At both locations the presence of demolition debris associated with residual flue dust is indicated (Tables 5-41 and -42). Given these findings and the results to the west of the former dust chambers (uphill) it appears that the dust chambers were demolished, with some debris being spread to the southeast.

Four soil borings were located to the east of the former arsenic processing area. At the southern location (EV-10) residual arsenic trioxide or flue dust associated with demolition debris is present (see Table 5-43). At the central and northern locations (EV-11 -12, and -3-S) there is no indication of smelter material (Tables 5-44, 5-45 and 5-46).

Two soil borings were installed to the south of the arsenic processing area. At location S-92, approximately 50 feet south of the footprint of the former arsenic mill storage bin, smelter material containing arsenic trioxide was found at 0.5 feet depth (Table 5-47). The material contained brick, indicating that it is demolition debris from the smelter structures. At a location approximately 150 feet south of S-92, no evidence of smelter material or residual arsenic trioxide was found (Table 5-48).

Seven surface samples were collected in the southern and north central portions of the area during previous investigations. The results of the surface samples in this area are presented in Table 5-112.

### 5.3.3 Findings of Recent Smelter Area Investigation - Arsenic Processing Area

Soil samples were collected from sixteen locations in the former arsenic processing area during the recent smelter area investigation (Figure 5-3). Two test pits installed within the footprint of the former southern arsenic kitchen found the presence of demolition debris (Tables 5-49 and 5-50). Arsenic levels indicate that residual arsenic trioxide is mixed with the debris to a depth of 3.5 feet in the western portion and to two feet in the eastern portion of former kitchen footprint. Vertical transport of arsenic to immediately underlying soils has occurred at both locations, however, arsenic concentrations attenuate rapidly.

Another test pit was excavated to investigate the subsurface conditions within the footprints of the former northern arsenic kitchen and the flue from the dust chambers to the smoke stacks (Figure 5-3). At both locations (TP-6A and TP-6B), intact floors and foundations of the former smelter structures were observed at approximately 1.5 feet below current ground surface. The location of the structures confirmed the expected position of former smelter structures relative to current features. At location TP-6A, within the western portion of the northern arsenic kitchen footprint, smelter debris residual arsenic trioxide was found above the intact floor (Table 5-51). Migration of arsenic to immediately underlying soils has occurred at this location, although concentrations attenuate rapidly. At location TP-6B (Table 5-52) demolition debris was also present above the intact flue floor. Migration of arsenic from these smelter materials has occurred, going deeper than at location TP-6A.

Three test pits were excavated within the footprint of the former arsenic process dust chambers. The excavations found intact floors of the dust chambers and confirmed the location of the former structures developed from smelter-era maps. The arsenic and lead concentrations and material descriptions indicate that smelter debris is present above the intact floors and that this material contains residual flue dust (Tables 5-53, -54 and -55). Migration of arsenic to immediately underlying soils has occurred at these locations.

One soil boring was installed within the footprint of the former arsenic ovens (location SA-6). Smelter debris containing residual flue dust/arsenic trioxide was identified in the one to four foot depth interval (Table 5-56). Migration of arsenic to underlying soils has also occurred.

One soil boring was drilled within the footprint of the former storage bin next to the arsenic mill. Smelter debris containing residual flue dust/arsenic trioxide was found in the upper two feet of soils. Transport of arsenic to underlying soils has also occurred at this location.

Seven soil borings were located to the south of the former arsenic processing area outside the fenced area to evaluate the nature and extent of demolition debris. The sample descriptions and arsenic concentrations (Tables 5-58 through 5-64) show no evidence of demolition debris or residual smelter material at these locations. Arsenic levels are lower than found in debris inside the fenced area and are consistent with deposition of air emissions during smelter operation with some variation due to cut and fill activities during subsequent residential development.

#### 5.3.4 Summary of Current Conditions in the Arsenic Processing Area

The former arsenic processing area is located within the currently fenced area. This process used roasting operations flue dust (typical arsenic concentration around 25,000 mg/Kg) to produce relatively pure arsenic trioxide (typical arsenic concentration lower than, but in the range of 760,000 mg/Kg). Residuals of these smelter materials are present primarily within the footprints of former structures where they were processed or stored. Intact floors and foundations of former smelter structures were identified at several sampling locations consistent with expectations based on the layout of the smelter shown on historical maps. The floors were typically present between one to three feet below current ground surface. Demolition of smelter structures and grading of debris in the immediate vicinity has resulted in flue dust/arsenic trioxide residuals mixed with brick debris and other structural material being present within and adjacent to the footprints of the former structures. However, soil borings drilled in the area immediately south of the fenced area

(between 10 and 70 feet from the fence) did not encounter any demolition debris from the smelter, indicating that debris outside the footprint of the former kitchens in the fenced area ends within a few feet. Arsenic concentrations in residual smelter material in this area are typically higher than in other areas due to the presence of arsenic trioxide residue.

## 5.4 GENERAL AREA OF FORMER STACKS

### 5.4.1 Description of Former Smelter Operations, Demolition and Subsequent Land Use

This area, located in the southwestern corner of the former smelter property, contained above-ground brick flues from the roasting operations and from the arsenic processing operations to two brick smoke stacks (Figure 5-4). Off-gases in the flues from roasting operations would have contained flue dust, and off-gases from arsenic processing operations would have contained arsenic trioxide. The majority of the former stack area is contained within the currently fenced area.

### 5.4.2 Findings of Previous Investigations in the Former Stack Area

A total of eighteen locations including four surface samples were investigated in the general area of the former stacks area during previous soil sampling activities (Figure 5-4). These sampling activities were performed prior to and during the RI.

Several soil borings were located within or near the footprints of the former flues in this area. At location EV-2-S, which is within five feet of the footprint of the flue from the roasting operations to the stacks, the presence of demolition debris to a depth of three feet with low levels of residual flue dust is indicated (Table 5-65).

Two soil borings were located within or immediately adjacent to the footprint of the former east-west oriented flues leading to the stacks. The results are essentially the same at both locations:

demolition debris, including flue dust is present to a depth of approximately two feet with transport of arsenic to underlying soils. The arsenic concentrations at location S-28/SAIC-S28 (Table 5-66), within the footprint of the former flue, are significantly higher than the concentrations measured at location S-27 (Table 5-67), which was approximately ten feet to the north of the footprint of the same flue.

Two soil borings were located approximately 30 feet north of the footprint of the former east-west oriented flues leading to the stacks. Soil boring S-36/SAIC-S36 (Table 5-68) indicates that demolition debris from the smelter including flue dust is present to a depth of approximately four feet. Soil boring S-72 indicates that smelter material including flue dust and demolition debris are present between two and four feet (Table 5-69). The arsenic concentrations and sample descriptions indicate that relatively pure flue dust is present in the three foot depth sample. Arsenic has been transported from this material to underlying soils.

Three soil borings were located to the south of the former flue footprints. At location S-37/SAIC-S37 (Table 5-70), which was located about 50 feet south of the former flue footprints and 125 feet east of the former stack locations, arsenic concentrations indicate the presence of flue dust residuals within the upper foot of soil. At the other two locations (SAIC-S29 and SAIC-S30: Table 5-71), arsenic concentrations are lower and the presence of significant flue dust residuals is not indicated.

One soil boring was located near the former smelter fenceline, approximately 130 feet west of the footprint of the former roaster dust chambers. This area was open ground during smelter operation. The data (Table 5-72) indicate that residual flue dust mixed with other material is present from two to three feet below ground surface. The samples were collected during the pre-RI and, because samples descriptions were not recorded, there is no indication if the flue dust is associated with smelter demolition debris or with other materials. It is noted that samples collected between this location and the footprints of former dust chambers and flues to the east and

south did not contain smelter material, and therefore it appears that this location represents an isolated area of fill.

Three soil borings (S-25, S-26 and S-35) were located to the south of S-34/SAIC-S34, toward the footprints of the former flues and stacks. The arsenic concentrations (Table 5-73) do not indicate the presence of smelter material containing significant amounts of residual flue dust.

Four surface samples were collected in the general area of former stacks during previous investigations. The results of the surface samples in this area are shown in Table 5-113.

#### 5.4.3 Findings of Recent Smelter Area Investigation - Former Stack Area

Soil samples were collected at ten locations in the former stacks area during the recent smelter area investigation (Figure 5-4). A test pit (TP-11) was excavated through the footprints of the former flues from the arsenic process dust chambers and the arsenic processing area. Floors of the flues from the arsenic processing area were found intact between three to four feet below current ground surface. The flue from the roasting plant was not present in this area due to excavation of a driveway and basement for the former residence. Therefore samples at TP-11C, proposed in the SAP, were not collected.

Arsenic concentrations in smelter debris above the intact floors were consistent with the presence of residual arsenic trioxide (Tables 5-74 and -75). Migration of arsenic to underlying soils has occurred at these locations.

A second test pit was excavated through the former flue footprints closer to the former location of the smoke stacks (location TP-10). Intact flue floors and foundations were observed at approximately four feet below current ground surface. Above these floors, a three to four foot thick layer of smelter debris was observed (Tables 5-76 and 5-77). The debris ended within a few

feet to the south. The northern extent was not delineated by the test pit. Based on the measured arsenic concentrations, residual arsenic trioxide or flue dust is present in the debris. Arsenic migration has occurred to underlying soils.

Five soil borings were located in the area adjacent to the footprints of the former smoke stacks and associated flues. The purpose of these locations was to evaluate the extent of debris from demolition of the smelter structures (Tables 5-78 through 5-82). None of the sampling locations found significant amounts of debris, indicating that smelter materials do not extend far from the footprints of the former structures and appear to be confined to the fenced area. Arsenic concentrations do not indicate the presence of smelter material containing residual flue dust or arsenic trioxide.

Previous findings to the north of the smoke stack area (around S-34) indicated that this location might contain isolated demolition debris and associated residual flue dust. Soil boring SA-18 located in this area (Table 5-83) found no evidence of demolition debris. The arsenic concentration in the upper foot of soil appears to be indicative of levels due to deposition of air emissions during smelter operation.

#### 5.4.4 Summary of Conditions in the Former Stack Area

The former flues in this area conveyed offgases containing flue dust or arsenic trioxide from the roasting operations and the arsenic processing operations to two smoke stacks near the top of the hill (just east of the current Hawthorne Street). The intact floors of the flues were identified at the test pit locations between four and five feet below current ground surface. Above the floors, demolition debris containing arsenic trioxide or flue dust residuals was found to be present. In small areas the flue materials have been removed during excavation activities associated with residential development (i.e., excavation of basements, walkways and driveways). Soil borings and test pits indicate that demolition debris does not extend far from the footprints of the former

flues and stacks. The samples indicated that all smelter residuals are contained within the fence in this area.

## 5.5 FORMER NORTHERN SMELTER AREA

### 5.5.1 Description of Former Smelter Operations, Demolition and Subsequent Land Use

The northern smelter area included rail lines and open ground (generally not used for smelter operations). The area was within the smelter property (Figure 5-5).

### 5.5.2 Findings of Previous Investigations in the Northern Smelter Area

Five soil borings located in the northern area (Figure 5-5) drilled during and before the RI found no evidence of demolition debris or residuals of smelter materials in subsurface soils (Table 5-84 through 5-88).

However, at location S-75 a surface soil sample (0 - 2 inches) contained 8,080 mg/Kg arsenic, indicating that residual smelter material is present at the surface at this location. Subsequently, the initial residential soil sampling program collected soil samples at twenty locations in the front and back yard of the residence (211 Medora Way). Samples were collected at depths of 0-2, 2-6, 0-6, 6-12, 12-18, 18-24, 24-30 and 30-36 inches. The arsenic and lead concentrations measured in these samples are shown in Table 5-89.

As shown, arsenic concentrations ranged from less than 18 mg/Kg to 4,379 mg/Kg, indicating that small pockets of smelter debris material are present in certain locations.

Six surface samples were collected in the northern smelter area during previous investigations. The results of the surface samples in this area are shown in Table 5-114.

### 5.5.3 Findings of Recent Smelter Area Investigation - Northern Smelter Area

Four soil borings were located in the former northern smelter area (Figure 5-5). Smelter debris was not observed in any of the borings and arsenic/lead concentrations appear to be consistent with levels from deposition of air emissions during smelter operation (Tables 5-90 through 5-93). Lead and arsenic concentrations at SA-20 and -21 were higher than at other locations. These are within about 30 feet of the former location of a rail line which transported lead ore to the roasting plant. These concentrations may be indicative of the effects of fugitive emissions from material transportation during smelter operation.

### 5.5.4 Summary of Conditions in the Northern Smelter Area

The former northern area was within the smelter property, but distant from the main operational area. Based on this location and knowledge about smelter demolition and subsequent land use it is not expected that significant quantities of smelter materials would be found in this area and this has been confirmed by the various sampling investigations. Small pockets of materials which contain lead and arsenic concentrations consistent with smelter residuals were identified at 211 Medora Way in previous investigations. The data indicate that small amounts of smelter material were mixed with soils, most likely during cut and fill activities associated with residential construction. However, other sampling has not identified similar material in the surrounding area.

## 5.6 STATE ROUTE 529 OVERPASS AREA

### 5.6.1 Description of Former Smelter Operations, Demolition and Subsequent Land Use

The current Overpass Area is adjacent to the location of the former blast furnace area during smelter operations. In 1956 significant cut and fill activities occurred as part of the construction of the road interchange of East Marine View Drive and State Route 529. Material was excavated

from the former blast furnace, roasting plant and northern smelter areas in the cloverleaf and used as fill beneath the south-bound lane of State Route 529 and around and beneath the Weyerhaeuser access road.

#### 5.6.2 Findings of Previous Investigations in the Overpass Area

Aerial photographs indicate that some material used as fill beneath State Route 529 came from the cloverleaf portion of the former smelter area. Bricks and wood fragments were observed during the lowlands RI, embedded in sandy fill under the south bound lane of the overpass. Ten samples of material were collected from the 0-6 inch depth interval and analyzed for arsenic. Total arsenic concentrations were below 60 mg/Kg in all but two of the samples which had concentrations of 180 and 1,700 mg/Kg.

#### 5.6.3 Findings of Recent Smelter Area Investigation - Overpass Area

Soil samples were collected at sixteen locations in the state route 529 overpass area during the recent smelter area investigation (Figure 5-6). The locations were laid out on a grid pattern, modified to account for physical obstacles. In general no evidence of significant quantities of residual flue dust or other high-lead or arsenic materials were identified at these sampling locations (Tables 5-94 through 5-109). The results are consistent with the finding that soils, including smelter material were excavated from the cloverleaf area during the construction of the road interchange and used as fill in this area. Arsenic and lead concentrations are elevated, but are much lower than levels measured in debris in the fenced area, and do not show a constant trend with depth, indicating that materials were well mixed during cut and fill activities.

#### 5.6.4 Summary of Conditions in the Overpass Area

The State Route 529 Overpass Area is located just northeast of the former blast furnace/lead refining operations area. Excavated soils including residual smelter material from the cloverleaf area were used as fill during construction of the road. Arsenic and lead concentrations are elevated, but are much lower than levels measured in debris in the fenced area, and do not show a constant trend with depth, indicating that any smelter materials were well mixed with soil during cut and fill activities.

**TABLE 5-1**  
**ARSENIC CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER NORTHERN ROASTER BUILDING**  
**(RI SAMPLING LOCATION B-2)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
ROA	surface	B-2	Brown fine sand, some silt (topsoil)	34
	3.0	B-2	Till	29
	6.0	B-2	Light brown silt	37
	7.0	B-2	Till	10
	9.0	B-2	Gray silt	4
	11.0	B-2	Gray silt. Dry	5
	13.0	B-2	As above	4
	15.0	B-2	As above	4

**TABLE 5-2**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE VICINITY OF THE FOOTPRINTS**  
**OF THE FORMER ORE SHED AND SULFIDE MILL**  
**(PRE-RI SAMPLING LOCATION SAIC-S77)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
ROA	surface	SAIC-S77	114
	0.5	SAIC-S77	10
	1.0	SAIC-S77	34
	2.0	SAIC-S77	24

\* No sample descriptions are available from the pre-RI sampling.

Note:

Smelter area sampling areas in tables are:

- ROA    Former Roasting Operations Area
- BFA    Former Blast Furnace/Lead Refining Operations Area
- APA    Former Arsenic Processing Area
- FSA    General Area of Former Stacks
- NSA    Northern Smelter Area
- R-529   State Route 529 Overpass Area

✓ **TABLE 5-3**  
**ARSENIC CONCENTRATIONS IN SOILS ADJACENT TO THE FOOTPRINT**  
**OF THE FORMER SOUTHERN ROASTER BUILDING**  
**(SAMPLING LOCATION S-4/SAIC-S4)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
ROA	surface	S-4	Brown to black topsoil, sandy, small gravels	1,340
		SAIC-S4	0.0-2.0"	4,860
	0.5	S-4	As above	2,460
		SAIC-S4		2,380
	1.0	S-4	Brown silty sand (brick chips)	4,290
		SAIC-S4		2,860
	2.0	S-4	Brown silty sand, small gravel	1,330
		SAIC-S4		5,820
	3.0	S-4	Black organic material, silty (brick chips)	2,720
		SAIC-S4		10,500
	4.0	S-4	Dark brown silty, mainly wood fibers	4,840
	6.0	S-4	Tan silty sand, small gravels	270
	7.0	S-4	As above	136
	11.0	S-4	Light grey silt, very dense, dry	11

✓ **TABLE 5-4**  
**ARSENIC CONCENTRATIONS IN SOILS ADJACENT TO THE FOOTPRINT**  
**OF A FORMER ABOVE-GROUND FLUE FROM THE ROASTERS TO THE SMOKE STACKS**  
**(PRE-RI SAMPLING LOCATION SAIC-S3)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
ROA	surface	SAIC-S3	286
	0.5	SAIC-S3	257
	1.0	SAIC-S3	915
	2.0	SAIC-S3	4,700
	3.0	SAIC-S3	2,340

\* No sample descriptions are available from the pre-RI sampling.

✓ TABLE 5-5

**ARSENIC CONCENTRATIONS IN SOILS ADJACENT TO THE FOOTPRINT  
OF A FORMER ABOVE-GROUND FLUE FROM THE ROASTERS TO THE SMOKE STACKS**

Area	Sampling Depth (feet)	Arsenic Concentration (mg/Kg)	
		Pre-RI Sampling Location SAIC-S1	Pre-RI Sampling Location SAIC-S2
ROA	surface	319	309
	0.5	215	142
	1.0	438	112
	2.0	1,010	952
	3.0	333	865

\* No sample descriptions are available from the pre-RI sampling.

✓ TABLE 5-6

**ARSENIC CONCENTRATIONS IN SOILS TO THE WEST OF THE FORMER ROASTER STACK  
(RI SAMPLING LOCATION S-22/SAIC-S22)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
ROA	surface	SAIC-S22	Pre-RI sample: no sample description 0.0-2.0"	1,490
	0.5	SAIC-S22	As above	4,230
	1.0	SAIC-S22	As above	3,590
	2.0	SAIC-S22	As above	1,710
	3.0	SAIC-S22	As above	455
	4.0	S-22	Light gray, slightly moist silt with occasional fine gravel	18
	6.0	S-22	Slightly moist, light gray, slightly fine sand	450
	7.0	S-22	Slightly moist, light gray uniform, medium-grained sand	236
	9.0	S-22	Slightly moist, light gray sandy silt	233
	11.0	S-22	Light gray sand, silt with large (1") iron stained lenses	58
	13.0	S-22	Moist, light gray, sandy silt with occasional fine gravel	19
	15.0	S-22	Moist, dense, light gray, sandy silt	18

✓ TABLE 5-7

**ARSENIC CONCENTRATIONS IN SOILS TO THE WEST OF THE FORMER ROASTER STACK  
(PRE-RI SAMPLING LOCATION SAIC-S24)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
ROA	surface	SAIC-S24	395
	0.5	SAIC-S24	456
	1.0	SAIC-S24	152
	2.0	SAIC-S24	48
	3.0	SAIC-S24	3

\* No sample descriptions are available from the pre-RI sampling.

✓ TABLE 5-8

**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT OF THE  
FORMER ROASTING OPERATIONS SMOKE STACK  
(SAMPLING LOCATION SA-1)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	0.0-1.0	SA-1	0-0.2 Asphalt 0.2-1.0 Smelter debris; brick fragments, sand and gravel	1,427	1,038
	1.0-2.0	SA-1	Smelter debris; brick fragments, sand and gravel	682	387
	2.0-3.0	SA-1	Smelter debris; brick fragments, sand and gravel	818	89
	3.0-4.0	SA-1	Smelter debris fragments; brick, sand and gravel	320	17
	4.0-5.0	SA-1	Brick: red, dry intact with gray and white sand layers	3,841	1,083
	6.0-6.25	SA-1	Brick: red, dry intact with gray and white sand layers. Refusal at 6.3 feet on smelter foundation.	515	77

✓ TABLE 5-9

**ARSENIC AND LEAD CONCENTRATIONS IN SOILS  
WITHIN THE FOOTPRINT OF THE FORMER ROASTING OPERATIONS FLUE DUST CHAMBERS  
(SAMPLING LOCATION SA-2)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	0.0-1.0	SA-2	0.0-0.2 Asphalt 0.2-1.0 Gravelly sand w/trace brick fragments at 1'	2,351	1,141
	1.0-2.0	SA-2	Smelter debris; brick and wood chunks	4,171	1,128
	2.0-3.0	SA-2	Silty sand	2,014	10
	3.0-4.0	SA-2	Silty sand	158	10
	4.0-5.0	SA-2	Silty sand	-	-
	5.0-6.0	SA-2	Silty sand	40	11
	6.0-7.0	SA-2	Silty sand	17	10

✓ TABLE 5-10

**ARSENIC AND LEAD CONCENTRATIONS IN SOILS  
WITHIN THE FOOTPRINT OF THE FORMER SOUTHERN ROASTER FLUES  
(SAMPLING LOCATION TP-3)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	0.0-1.0	TP-3	Silty loam	1,704	911
	1.0-2.0	TP-3	Abundant red brick fragments	9,043	2,425
	2.0-3.0	TP-3	Intact flue structure filled with grey sand with yellow staining (flue dust)	21,686	89
	3.0-4.0	TP-3	As above	28,579	51
	4.0-5.0	TP-3	Intact brick foundation	1,883	58
	5.0-6.0	TP-3	As above	6,902	794
	6.0-7.0	TP-3	As above	7,084	275
	7.0-8.0	TP-3	Silt	203	13
	8.0-9.0	TP-3	Sand and silt	507	10
	9.0-10.0	TP-3	Silty sand	655	10
	10.0-11.0	TP-3	Silty sand	744	12

✓ TABLE 5-11

**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WEST OF THE FOOTPRINTS OF THE FORMER  
ROASTING OPERATIONS FLUES  
(SAMPLING LOCATION SA-4)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	0.0-1.0	SA-4	Silty loam, trace brick fragments	11,792	12,116
	1.0-2.0	SA-4	Smelter debris; brick fragments 2" chunk of wood at top	2,618	530
	2.0-3.0	SA-4	Silty sand	13	22
	3.0-4.0	SA-4	Silty sand	26	14
	4.0-5.0	SA-4	Silty sand	14	10
	5.0-6.0	SA-4	Silty sand	10	10

✓ TABLE 5-12

**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT  
OF THE FORMER ORE SHED  
(SAMPLING LOCATION SA-3)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	0.0-1.0	SA-3	Sandy loam	13	1,315
	1.0-2.0	SA-3	Sand	21	118
	2.0-3.0	SA-3	2.0-2.3' Sand 2.3-3.0' Silt	21	106
	3.0-4.0	SA-3	Silt	10	10

✓ **Table 5-13**  
**Arsenic and Lead Concentrations in Soils East of the**  
**Former Roasters**  
**(Sampling Location TB-3)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	0.0-0.5	TB-3	Asphalt	18	20
	2.0-3.5	TB-3	Silty Sand, Grey to Light Brown	218	158
	5.0-6.5	TB-3	Silty Sand, Grey to Light Brown	20	31
	10.0-11.5	TB-3	Silty Sand, Light Brown	660	40
	15.0-16.5	TB-3	Silty Sand, Light Brown	194	10
	20.0-21.5	TB-3	Silty Sand, Light Brown	206	10
	25.0-26.5	TB-3	Silty Sand, Light Brown	10	13
	30.0-31.5	TB-3	Sandy Silt	10	10
	35.0-36.5	TB-3	Sand	10	10
	37.5-39.0	TB-3	Sand	291	10

✓ **TABLE 5-14**  
**ARSENIC CONCENTRATIONS IN SOILS ADJACENT TO THE FOOTPRINT**  
**OF THE FORMER BLAST FURNACE FLUE**  
**(RI LOCATION EV-13)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
BFA	0.0 - 0.5	EV-13	Road base fill	487
	2.0 - 3.5	EV-13	Silty sand. Moist	11,810
	5.0 - 5.5	EV-13	As above	2,785
	5.5 - 6.5	EV-13	As above	1,831
	10.0 - 11.5	EV-13	Silty sand. Slightly moist	2,259

✓ **TABLE 5-15**  
**ARSENIC CONCENTRATIONS IN SOILS SOUTH OF THE FOOTPRINT**  
**OF THE FORMER BLAST FURNACE FLUE**  
**(PRE-RI SAMPLING LOCATION SAIC-S48)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
BFA	surface	SAIC-S48	791
	0.5	SAIC-S48	584
	1.0	SAIC-S48	780
	2.0	SAIC-S48	49
	3.0	SAIC-S48	97

\* No sample descriptions are available from the pre-RI sampling.

✓ **TABLE 5-16**  
**ARSENIC CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER BLAST FURNACE BUILDING**  
**(RI SAMPLING LOCATION B-1)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
BFA	surface	B-1	Topsoil, root material	24
	2.0	B-1	Topsoil, organic, rich, root material, silty clay	10
	4.0	B-1	Sandy silt, some pebbles, grayish-brown	2
	6.0	B-1	Sandy silt, pebbles, gray-brown	3
	9.0	B-1	Glacial till, silt, rounded pebbles, sandy. Tan weathered granites (could still be fill material)	2
	11.0	B-1	Gravelly silt, moist	6
	13.0	B-1	Gravelly silt, pebbles, tan, little sand	6
	15.0	B-1	Gravelly silt, oxidation stains near base	4

✓ TABLE 5-17

**ARSENIC CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT OF  
THE FORMER ORE BUILDING  
(RI SAMPLING LOCATION B-3)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
BFA	surface	B-3	Silt - light brown: with very fine sand, root mass: dry	49
	2.0 - 3.5	B-3	Sandy silt - light brown; red brick fragments, oxidation and mottled throughout, green precipitate	1,059
	5.0 - 6.5	B-3	Sandy silt - light brown, very fine grained sand	117
	10 - 10.5	B-3	Sandy silt - light brown; sandy clay lens. Moist	31
	15 - 15.25	B-3	Sandy gravel - grey. Wet	7

✓ TABLE 5-18

**ARSENIC CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT  
OF THE FORMER BLAST FURNACE BUILDING  
(RI SAMPLING LOCATION EV-14)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
BFA	0.0 - 0.5	EV-14	Road base	53
	2.0 - 3.5	EV-14	Sandy silt. Slightly moist	24
	5.0 - 6.5	EV-14	As above	4
	10.0 - 11.5	EV-14	As above	20

✓ TABLE 5-19

**ARSENIC CONCENTRATIONS IN SOILS IN THE VICINITY OF THE FOOTPRINT  
OF THE FORMER LEAD REFINING BUILDING  
(RI SAMPLING LOCATION B-5)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
BFA	surface	B-5	Silty sand - light brown, abundant root mass. Dry	18
	2.0 - 3.0	B-5	Sandy silt. Dry	3
	5.0 - 5.5	B-5	As above	4
	10.0 - 10.75	B-5	As above	5
	15 - 16	B-5	Sand. Moist	3

**TABLE 5-20**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE VICINITY OF THE FOOTPRINT**  
**OF THE FORMER LEAD REFINING BUILDING**  
**(RI SAMPLING LOCATION B-6)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
BFA	surface	B-6	Silty sand - light brown, abundant root mass. Dry	25
	2.0 - 3.5	B-6	Silt - light brown. Moist	3
	5.0 - 5.5	B-6	As above	4
	10.0 - 11.0	B-6	Silt with gravel and sand	2
	15 - 15.5	B-6	Silty sand. Moist	4

**TABLE 5-21**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE VICINITY OF THE FOOTPRINT**  
**OF THE FORMER LEAD REFINING BUILDING**  
**(PRE-RI SAMPLING LOCATION SAIC-S69)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
BFA	surface	SAIC-S69	67
	0.5	SAIC-S69	121
	1.0	SAIC-S69	41
	2.0	SAIC-S69	4
	3.0	SAIC-S69	4

\* No sample descriptions are available from the pre-RI sampling.

**TABLE 5-22**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS EAST OF THE FORMER**  
**BLAST FURNACE FLUE**  
**(RI SAMPLING LOCATION EV-4B-S)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	0.0-1.5	EV-4B-S	16	12
	1.5-3.0	EV-4B-S	7	11
	4.4-6.0	EV-4B-S	3	4
	9.0-10.5	EV-4B-S	14	8
	15.0-17.0	EV-4B-S	138	140
	24.0-25.5	EV-4B-S	4	7
	55.5-57.5	EV-4B-S	5	1

**TABLE 5-23**  
**ARSENIC AND LEAD CONCENTRATIONS IN TRENCH SAMPLES IN THE**  
**VICINITY OF FORMER BUILDINGS ASSOCIATED WITH**  
**BLAST FURNACE/LEAD REFINING OPERATIONS**

Area	Sampling Depth	Arsenic Concentration (mg/Kg)	
		Sampling Location T-6	Sampling Location T-7
FSA	A Horizon*	23.9	931
	B Horizon*	42.2	1050
	C Horizon*	5.1	468

\*Depth data not available

**TABLE 5-24**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**WITHIN THE FOOTPRINT OF THE FORMER ARSENIC STORAGE BUILDING**  
**(RI SAMPLING LOCATION B-4)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	0.0-0.2	B-4	Sand - Brown with silt, 10% gravel, abundant roots	8.9	76
	2.0-6.5	B-4	Sandy silt - Brown, uniform	20	60
	7.5-9.0	B-4	Silty sand - Light Brown Grey, 5% subrounded gravel	6.9	19
	10.0-10.5	B-4	Silty sand - Light Brown Grey, 20% fine gravel	2.6	2.8
	15.0-15.5	B-4	Silty sand - Light Brown Grey, 10% fine gravel	2.3	2.2

**TABLE 5-25**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER ARSENIC STORAGE BUILDING**  
**(SAMPLING LOCATION SA-23)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	0.0-1.0	SA-23	0.0-0.7' Silty loam 0.7-1.0' Silty sand	25	211
	1.0-2.0	SA-23	Silty sand	12	28
	2.0-3.0	SA-23	Silty sand	10	19
	3.0-4.0	SA-23	Silty sand	12	82
	4-0-5.0	SA-23	Silty sand	10	36

**TABLE 5-26**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER LEAD REFINING BUILDING**  
**(SAMPLING LOCATION SA-24)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	0.0-1.0	SA-24	Asphalt and gravel	18	20
	1.0-2.0	SA-24	Gravelly sand	10	10
	2.0-3.0	SA-24	Sandy silt	36	63
	3.0-4.0	SA-24	Sandy silt	10	10
	4.0-5.0	SA-24	Sandy silt	10	17

**TABLE 5-27**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**ADJACENT TO THE FORMER DUST CHAMBERS**  
**(SAMPLING LOCATION TB-1)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	0.0-0.5	TB-1	Asphalt	18	20
	2.0-3.5	TB-1	Silt	46	27
	5.0-6.5	TB-1	Silt	48	417
	10.0-11.5	TB-1	Gravelly sandy silt	695	63
	15.0-16.5	TB-1	Silty gravelly sand	455	13
	20.0-21.5	TB-1	Sand and gravel	197	12
	25.0-26.5	TB-1	Sand	201	10
	30.0-31.5	TB-1	Silt	120	10
	35.0-36.5	TB-1	Sand	76	10

**TABLE 5-28**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER FLUE NEAR THE STACK**  
**(SAMPLING LOCATION SA-5)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	0.0-1.0	SA-5	Silty loam	4,677	942
	1.0-2.0	SA-5	Intact brick structure	808	115
	2.0-3.0	SA-5	As above	47	14
	3.0-4.0	SA-5	As above	60	14
	4.0-5.0	SA-5	As above	11	15
	5.0-6.0	SA-5	As above	35	17
	8.0-9.0	SA-5	Silty sand	317	10
	11.0-12.0	SA-5	Silty sand	280	10
	14.0-15.0	SA-5	Silty sand	61	13

**TABLE 5-29**  
**ARSENIC AND LEAD CONCENTRATIONS IN SURFACE SOILS**  
**AROUND THE SOUTHERN CLOVERLEAF AREA**

Area	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	SAI-SS-1	Surface Sample	18	35
	SAI-SS-2	Surface Sample	82	364
	SAI-SS-3	Surface Sample	15	14

**TABLE 5-30**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS WITHIN THE FOOTPRINT**  
**OF A FORMER ARSENIC STORAGE BIN**  
**(RI SAMPLING LOCATION S-111)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	surface	S-111	Topsoil, fill material, brown medium sand, silt organic material	205
	0.5	S-111	As above	4,100
	1.0	S-111	Multi-colored smelter debris (white, red, gray), brick chips, mortar	727,000
	2.0	S-111	White crystalline material, strong odor	430,000
	3.0	S-111	Brick material, medium sand, silt, brown, white specks	622,500
	4.0	S-111	As above	150,000
	7.0	S-111	Light grey silt, fine sand, small gravel, dense	19,140
	9.0	S-111	Light gray silt, very dense, small gravel	11,950
	11.0	S-111	As above	1,800

**TABLE 5-31**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER SOUTHERN ARSENIC KITCHEN**  
**(PRE-RI SAMPLING LOCATION SAIC-S17)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
APA	surface	SAIC-S17	235
	0.5	SAIC-S17	241
	1.0	SAIC-S17	366
	2.0	SAIC-S17	976
	3.0	SAIC-S17	1,190

*\*No sample descriptions are available from the pre-RI sampling.*

**TABLE 5-32**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS WITHIN THE FOOTPRINT OF THE**  
**FORMER FLUE FROM THE ARSENIC OVENS TO THE KITCHENS**  
**(RI SAMPLING LOCATION S-112)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	surface	S-112	Brown to black organic material, sandy, some small gravel	1,510
	0.5	S-112	Silty, red (brick color), little clays, some oxidation	143,600
	1.0	S-112	Brown silty sand, some red, some oxidation	143,500
	2.0	S-112	Red silty (brick), some oxidation, little clays	83,600
	3.0	S-112	Sandy silt, red, some oxidation	34,950
	4.0	S-112	Brown sandy silt (brick chips) & had 1 foot void	20,550

**TABLE 5-33**  
**ARSENIC CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT OF THE**  
**FORMER FLUE ADJACENT TO THE ARSENIC OVENS**  
**(RI SAMPLING LOCATION S-113)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	surface	S-113	Topsoil, organic material (brick chips), sandy	26,550
	0.5	S-113	Brown sandy silt, brick chips, small slag	38,650
	1.0	S-113	Brownish-red silts with brick chips	30,150
	2.0	S-113	Brownish-red silts, small gravels, small slag	25,540
	3.0	S-113	Black silty sand, small gravels	9,060
	4.0	S-113	Tan sandy silt, small gravels	2,620
	6.0	S-113	Brown silt with black (organic?) streaking	13,030
	7.0	S-113	Light gray silt with light brown marbling, moist	4,795
	9.0	S-113	Very dense, light grey silt, with gravels, slightly moist	864
	11.0	S-113	Dense, light gray, sandy silt with occasional gravel. Moist	389
	13.0	S-113	As above with sandy silt lens at 13', slightly moist	346
	15.0	S-113	Dry, dense, light gray silt with occasional gravel	282

**TABLE 5-34**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS**  
**ADJACENT TO THE FORMER ARSENIC KITCHENS**  
**(RI SAMPLING LOCATION S-15/SAIC-S15)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	surface	S-15	Organic material, sandy, crushed gravel	103
		SAIC-S15	0.0-2.0"	50
	0.5	SAIC-S15		313
	0.5 - 0.75	S-15	Brown silty sand	230
	1.0	S-15	Brown silty sand, brick material	870
		SAIC-S15		577
	2.0	S-15	Brown silty clay, small gravels	1,670
		SAIC-S15		2,650
	3.0	S-15	Brown silty/very little clay, wet	1,780
		SAIC-S15		44,700
	4.0	S-15	Tan silty clay, hit top of flume? Hard. pipe? Sized off and had 1 foot void	650
	6.0	S-15	Tan, silty clay	3,040
	7.0	S-15	Moist, light gray silt with occasional gravel	1,074
	9.0	S-15	As above	293
	11.0	S-15	Sandy silt lens 10.7 to 11'. Light gray silt with occasional coarse gravel	526
	13.0	S-15	Dry, light gray silt with occasional coarse gravel	123
	15.0	S-15	As above	258

**TABLE 5-35**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS IN THE VICINITY OF THE**  
**FOOTPRINT OF THE FORMER ARSENIC OVENS**  
**(PRE-RI SAMPLING LOCATION SAIC-S45)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
APA	surface	SAIC-S45	7,450
	1.0	SAIC-S45	13,700
	2.0	SAIC-S45	4,730
	3.0	SAIC-S45	1,940

*\*No sample descriptions are available from the pre-RI sampling.*

**TABLE 5-36**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER ARSENIC PROCESS DUST CHAMBERS**  
**(RI SAMPLING LOCATION S-13/SAIC-S13)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	surface	S-13	Top soil	1,400
		SAIC-S13	0.0-2.0"	1,350
	0.5	S-13	Smelter debris	1,600
		SAIC-S13		1,500
	1.0	S-13	Bricks	14,000
		SAIC-S13		9,150
	2.0	S-13	Smelter debris/bricks	4,500
		SAIC-S13		6,100
	3.0	S-13	Bricks	11,200
		SAIC-S13		2,620
	4.0	S-13	Smelter debris - till interface	6,500
	6.0	S-13	Slightly moist, gray silt with occasional gravel	1,100
	7.0	S-13	As above	214
	9.0	S-13	Dry as above	717
	11.0	S-13	Two inch sand lens at 11'. Dry, gray silt	313
	13.0	S-13	Dry gray silt, with occasional well rounded gravel	409
	15.0	S-13	Moist sandy gray silt, some silty sand, lenses	490

**TABLE 5-37**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER ARSENIC PROCESS DUST CHAMBERS**  
**(RI SAMPLING LOCATION S-8/SAIC-S8)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	surface	S-8	Topsoil	10,800
		SAIC-S8	0.0-2.0"	917
	0.5	S-8	Brown silt, sandy, gravelly	6,700
	1.0	S-8	As above	5,300
	2.0	S-8	Grey silt, clayey, dark organic material	18,000
	3.0	S-8	Grey silt, clayey, oxidation spots. Hit water at 2.5'	1,500
	4.0	S-8	Gray silt, clayey, some gravel	1,400
	6.0	S-8	Gray silt, clayey, dense. Till first encountered at 5'8"	1,000
	7.0	S-8	As above	129

**TABLE 5-38**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER ARSENIC PROCESS DUST CHAMBERS**  
**(PRE-RI SAMPLING LOCATION SAIC-S9)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
APA	surface	SAIC-S9	1,030
	0.5	SAIC-S9	7,210
	1.0	SAIC-S9	6,170
	2.0	SAIC-S9	3,300
	3.0	SAIC-S9	1,080

*\*No sample descriptions are available from the pre-RI sampling.*

**TABLE 5-39**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS ADJACENT**  
**TO THE FOOTPRINT OF THE FORMER FLUE FROM THE ARSENIC**  
**PROCESS DUST CHAMBERS TO THE SMOKE STACKS**  
**(PRE-RI LOCATION SAIC-S14)**

Area	Sample Depth	Location	Arsenic Concentration (mg/Kg)
APA	surface	SAIC-S14	833
	0.5	SAIC-S14	2,190
	1.0	SAIC-S14	3,330
	2.0	SAIC-S14	6,490
	3.0	SAIC-S14	2,410

*Note: Samples collected during the pre-RI: no sample descriptions recorded.*

**TABLE 5-40**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS TO THE WEST**  
**OF THE FOOTPRINT OF THE FORMER ARSENIC PROCESS DUST CHAMBERS**

Area	Sample Depth	RI Sampling Location SAIC-S10	RI Sampling Location SAIC-S11	RI Sampling Location SAIC-S12
APA	surface	194	114	38
	0.5	32	130	412
	1.0	34	355	266
	2.0	147	192	255
	3.0	25	336	758

*Note: Samples collected during the pre-RI: no sample descriptions recorded.*

**TABLE 5-41**  
**ARSENIC CONCENTRATIONS IN SOILS TO THE EAST OF THE CENTRAL PORTION**  
**OF THE FORMER ARSENIC DUST CHAMBERS FOOTPRINT**  
**(RI SAMPLING LOCATION S-47/SAIC-S47)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	surface	S-47	Top soil, sandy, organic material, brick pieces	2,580
		SAIC-S47	0.0-2.0"	3,880
	0.5	S-47	Topsoil, sandy, organic material	3,420
		SAIC-S47		4,080
	1.0	S-47	Gravel, sandy, little silt	4,980
		SAIC-S47		5,380
	2.0	S-47	Brown sand, gravelly, little silt, some brick	2,890
		SAIC-S47		5,130
	3.0	S-47	Brown sand, silty, black clay lenses, trace gravel	1,660
		SAIC-S47		2,150
	4.0	S-47	Tan sand, clayey, little gravel, oxidation staining	1,630
	6.0	S-47	Light gray sand, silty, clay lenses, some organic material	1,670
	7.0	S-47	Light grey silt, very dense, small gravel	466
	11.0	S-47	Light grey silt, gravel	642

**TABLE 5-42**  
**ARSENIC CONCENTRATIONS IN SOILS TO THE EAST OF THE SOUTHERN PORTION OF THE**  
**FORMER ARSENIC PROCESS DUST CHAMBERS FOOTPRINT**  
**(RI SAMPLING LOCATION S-46/SAIC-S46)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	surface	S-46	Topsoil, piece of brick	1,600
		SAIC-S46	0.0-2.0"	1,860
	0.5	S-46	Brown silt, sandy, gravelly	1,600
		SAIC-S46		2,590
	1.0	S-46	Topsoil, piece of brick	2,100
		SAIC-S46		3,170
	2.0	S-46	Topsoil, some gravel, brick	3,400
		SAIC-S46		3,120
	3.0	S-46	Topsoil, black clay, brick	3,300
		SAIC-S46		2,440
	4.0	S-46	Topsoil, black clay	900
	6.0	S-46	Tan sand, silt, gravel, some clay	900
	7.0	S-46	Moist, light gray, gravelly sandy silt	603
	9.0	S-46	As above	1,052
	11.0	S-46	Slightly moist, light gray silt with occasional fine gravel	512
	13.0	S-46	Dry, as above	134
	15.0	S-46	As above with coarse gravels	133

**TABLE 5-43**  
**ARSENIC CONCENTRATIONS IN SOILS WEST OF THE FORMER ARSENIC OVENS AND**  
**ARSENIC MILL IN THE FORMER SMELTER OFFICE AREA**  
**(RI LOCATION EV-10)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	0.0 - 0.5	EV-10	Road base fill	55
	2.0 - 2.8	EV-10	Silty sand. Half inch brick layer	1,660
	2.8 - 3.5	EV-10	Fine sand & silt. Moist	7,660
	5.0 - 5.5	EV-10	Sandy silt. Moist	773
	10.0 - 10.5	EV-10	Silty sand. Moist	1,728
	10.5 - 11.0	EV-10	As above	280

**TABLE 5-44**  
**ARSENIC CONCENTRATIONS IN SOILS WEST OF THE FORMER ARSENIC OVENS AND**  
**ARSENIC MILL IN THE FORMER SMELTER OFFICE AREA**  
**(RI LOCATION EV-11)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	0.0 - 0.5	EV-11	Road base fill	37
	2.0 - 3.5	EV-11	Sandy silt	77
	5.0 - 6.5	EV-11	Sandy silt. Moist	3,112
	10.0 - 11.5	EV-11	As above	748
	12.5 - 13.5	EV-11	As above. Slightly moist	364

**TABLE 5-45**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS NEAR THE WESTERN BOUNDARY**  
**OF THE FORMER ARSENIC PROCESSING AREA**  
**(RI LOCATION EV-12)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	0.0 - 0.5	EV-12	Road base fill	49
	2.0 - 3.5	EV-12	Sandy silt. Moist	56
	5.0 - 6.5	EV-12	Sandy silt. Coarse sand lens at 6.25'. Moist	776
	10.5 - 11.5	EV-12	Silty sand. Moist	187
	12.5 - 13.5	EV-12	Silty sand. Slightly moist	60

**TABLE 5-46**  
**ARSENIC AND LEAD CONCENTRATIONS IN SUBSURFACE SOILS NEAR THE WESTERN**  
**BOUNDARY OF THE FORMER ARSENIC PROCESSING AREA**  
**(SAMPLING LOCATION EV-3-S)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	1.0-2.5	EV-3-S	288	66
	4.0-5.5	EV-3-S	248	44
	8.5-10.0	EV-3-S	212	--
	10.0-11.5	EV-3-S	34	4
	14.5-16.8	EV-3-S	83	7
	24.0-25.5	EV-3-S	66	--
	34.0-35.5	EV-3-S	14	6
	44.0-45.5	EV-3-S	5	3
	49.0-50.5	EV-3-S	3	6

**TABLE 5-47**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS TO THE SOUTH**  
**OF THE FORMER ARSENIC PROCESSING AREA**  
**(RI LOCATION S-92)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
APA	Surface	S-92	Black sandy silt, roots and grass	2,569
	0.5	S-92	Brown fine-medium sand with brick fragments	29,000
	1.0	S-92	Brown silt, fine sand	7,534
	2.0	S-92	Light brown silt	3,215
	3.0	S-92	As above	3,681
	4.0	S-92	Light brown sand	1,780
	6.0	S-92	Grey brown fine sand	753
	7.0	S-92	Grey fine sand	435
	9.0	S-92	Silty fine sand	253

**TABLE 5-48**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS TO THE SOUTH**  
**OF THE FORMER ARSENIC PROCESSING AREA**  
**(PRE-RI LOCATION SAIC-S43)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
APA	surface	SAIC-S43	239
	0.5	SAIC-S43	231
	1.0	SAIC-S43	528
	2.0	SAIC-S43	104
	3.0	SAIC-S43	13

*\*No sample descriptions are available from the pre-RI sampling.*

**TABLE 5-49**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER SOUTHERN ARSENIC KITCHEN**  
**(SAMPLING LOCATION TP-4)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	TP-4	Sandy loam	565	152
	1.0-2.0	TP-4	Smelter debris; occasional brick debris	1,981	144
	2.0-3.0	TP-4	Smelter debris; abundant brick debris	8,799	533
	3.0-4.0	TP-4	3.0-3.5' Smelter debris; abundant brick debris 3.5-4.0' Sand	32,918	468
	4.0-5.0	TP-4	4.0-4.5' Sand 4.5-5.0' Sand and silt	4,724	30
	5.0-6.0	TP-4	Sand and silt	1,600	16
	6.0-7.0	TP-4	Sandy silt	225	10
	8.0-9.0	TP-4	Sandy silt	219	10
	10.0-11.0	TP-4	Sandy silt	206	10

**TABLE 5-50**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER SOUTHERN ARSENIC KITCHEN**  
**(SAMPLING LOCATION TP-5)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	TP-5	Sandy loam	1,161	473
	1.0-2.0	TP-5	Smelter debris; abundant red brick fragments	5,370	92
	2.0-3.0	TP-5	Gravelly silt and sand	2,777	34
	3.0-4.0	TP-5	Silt and sand	827	13
	4.0-5.0	TP-5	Silt and sand	502	10

**TABLE 5-51**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER NORTHERN ARSENIC KITCHEN**  
**(SAMPLING LOCATION TP-6A)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	TP-6A	Smelter debris; rounded brick fragments	4,373	289
	1.0-2.0	TP-6A	Smelter debris; mortared brick layer	12,487	458
	2.0-3.0	TP-6A	Silty sand	9,726	38
	3.0-4.0	TP-6A	Silty sand	9,252	29
	4.0-5.0	TP-6A	Silt and sand	4,305	10
	5.0-6.0	TP-6A	Silt and sand	3,235	10
	6.0-7.0	TP-6A	Sandy silt	353	10
	8.0-9.0	TP-6A	Sandy silt	706	10
	10.0-11.0	TP-6A	Sandy silt	412	10
	12.0-13.0	TP-6A	Silt	249	10

**TABLE 5-52**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER FLUE FROM THE DUST CHAMBERS TO THE STACKS**  
**(SAMPLING LOCATION TP-6B)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	TP-6B	Silty loam	9,388	544
	1.0-2.0	TP-6B	Smelter debris; intact brick floor	14,223	505
	2.0-3.0	TP-6B	Silty sand	13,985	10
	3.0-4.0	TP-6B	Silty sand	13,537	14
	4.0-5.0	TP-6B	Silt and sand	5,497	10
	5.0-6.0	TP-6B	Silt and sand	2,740	10

**TABLE 5-53**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER ARSENIC PROCESS DUST CHAMBERS**  
**(SAMPLING LOCATION TP-7)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	TP-7	Sandy loam	2,220	523
	1.0-2.0	TP-7	Smelter debris; red brick fragments	8,771	594
	2.0-3.0	TP-7	Smelter debris; red brick fragments	9,935	415
	3.0-4.0	TP-7	Silty sand and gravel	10,644	47
	4.0-5.0	TP-7	Silty sand and gravel	6,586	10
	5.0-6.0	TP-7	Silty sand	2,952	12
	6.0-7.0	TP-7	Silty sand	684	10
	8.0-9.0	TP-7	Silty sand	698	10
	10.0-11.0	TP-7	Silty sand	541	10

**TABLE 5-54**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER ARSENIC PROCESS DUST CHAMBERS**  
**(SAMPLING LOCATION TP-8)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	TP-8	Smelter debris; red brick fragments	3,738	625
	1.0-2.0	TP-8	Smelter debris; red brick fragments	2,797	415
	2.0-3.0	TP-8	Smelter debris; abundant brick fragments	4,619	309
	3.0-4.0	TP-8	Smelter debris; abundant brick fragments	7,237	200
	4.0-5.0	TP-8	Sandy silt	4,669	17
	5.0-6.0	TP-8	Gravelly sand	564	11

**TABLE 5-55**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT**  
**OF THE FORMER ARSENIC PROCESS DUST CHAMBERS**  
**(SAMPLING LOCATION TP-9)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	TP-9	Smelter debris; red brick fragments	33,665	947
	1.0-2.0	TP-9	Smelter debris; black wood fragments	10,503	795
	2.0-3.0	TP-9	Smelter debris; black wood fragments	5,668	672
	3.0-4.0	TP-9	Silty sand and gravel	7,821	16
	4.0-5.0	TP-9	Silty sand and gravel	1,564	14
	5.0-6.0	TP-9	Silty and sand	535	14

**TABLE 5-56**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**WITHIN THE FOOTPRINT OF THE FORMER ARSENIC OVENS**  
**(SAMPLING LOCATION SA-6)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-6	Silty loam	3,633	304
	1.0-2.0	SA-6	1.0-1.5' Silty loam 1.5-2.0' Brick	39,777	1,327
	2.0-3.0	SA-6	Smelter debris	40,938	41
	3.0-4.0	SA-6	Smelter debris	33,201	20
	4.0-5.0	SA-6	Silty sand	7,903	215
	5.0-6.0	SA-6	Silty sand	1,260	10
	6.0-7.0	SA-6	Silty sand	-	-
	7.5-9.0	SA-6	Silty sand	2,761	10

**TABLE 5-57**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**WITHIN THE FOOTPRINT OF THE FORMER ARSENIC MILL STORAGE BIN**  
**(SAMPLING LOCATION SA-7)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-7	Silty loam	19,122	486
	1.0-2.0	SA-7	Smelter debris; trace brick fragments	38,751	563
	2.0-3.0	SA-7	Sandy silt	14,277	10
	3.0-4.0	SA-7	Sandy silt	7,476	10
	4.0-5.0	SA-7	Sandy silt	5,245	10
	5.0-6.0	SA-7	Sandy silt	1,348	10
	7.5-9.0	SA-7	Gravelly silty sand	402	10
	10.0-11.0	SA-7	Gravelly silty sand	258	10

**TABLE 5-58**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS SOUTH OF THE**  
**FORMER ARSENIC PROCESSING AREA OUTSIDE THE FENCED AREA**  
**(SAMPLING LOCATION SA-8)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-8	Silty gravelly sand	1,208	199
	1.0-2.0	SA-8	Silty gravelly sand	111	12
	2.0-3.0	SA-8	Gravelly silty sand	79	10
	3.0-4.0	SA-8	Gravelly silty sand	42	10
	4.0-5.0	SA-8	Sandy silt	52	10

**TABLE 5-59**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**SOUTH OF THE FORMER ARSENIC PROCESSING AREA OUTSIDE THE FENCED AREA**  
**(SAMPLING LOCATION SA-9)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-9	Silty sand	798	473
	1.0-2.0	SA-9	Silty sand	813	625
	2.0-3.0	SA-9	Silty sand	1,078	436
	3.0-4.0	SA-9	Silty sand	1,189	221
	4.0-5.0	SA-9	Silty sand	51	11

**TABLE 5-60**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**SOUTH OF THE FORMER ARSENIC PROCESSING AREA OUTSIDE THE FENCED AREA**  
**(SAMPLING LOCATION SA-10)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-10	Silty loam	312	113
	1.0-2.0	SA-10	Silty sand	10	10
	2.0-3.0	SA-10	Silty sand	70	10
	3.0-4.0	SA-10	Silty sand	10	10
	4-0-5.0	SA-10	Silty sand	14	10

**TABLE 5-61**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**SOUTH OF THE FORMER ARSENIC PROCESSING AREA OUTSIDE THE FENCED AREA**  
**(SAMPLING LOCATION SA-11)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-11	Sandy loam	258	101
	1.0-2.0	SA-11	Silty sand	231	10
	2.0-3.0	SA-11	Silty sand	10	11
	3.0-4.0	SA-11	Silty sand	10	10
	4-0-5.0	SA-11	Sandy silt	10	12

**TABLE 5-62**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**SOUTH OF THE FORMER ARSENIC PROCESSING AREA OUTSIDE THE FENCED AREA**  
**(SAMPLING LOCATION SA-12)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-12	Silty sand	968	604
	1.0-2.0	SA-12	Gravelly sand and silt	125	52
	2.0-3.0	SA-12	Gravelly sand and silt	14	11
	3.0-4.0	SA-12	Gravelly sand and silt	10	10
	4-0-5.0	SA-12	Gravelly sand and silt	10	13

**TABLE 5-63**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**SOUTH OF THE FORMER ARSENIC PROCESSING AREA OUTSIDE THE FENCED AREA**  
**(SAMPLING LOCATION SA-25)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-25	0.0-0.5' Asphalt 0.5-1.0' Gravelly sand	249	36
	1.0-2.0	SA-25	Gravelly sand	429	43
	2.0-3.0	SA-25	Silty sand	122	10
	3.0-4.0	SA-25	Silty sand	10	10
	4.0-5.0	SA-25	Silty sand	140	12

**TABLE 5-64**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**SOUTH OF THE FORMER ARSENIC PROCESSING AREA OUTSIDE THE FENCED AREA**  
**(SAMPLING LOCATION SA-26)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-26	Asphalt	228	72
	1.0-2.0	SA-26	Gravelly Sand	1105	257
	2.0-3.0	SA-26	Gravelly Sandy Silt	390	10
	3.0-4.0	SA-26	Gravelly Sandy Silt	54	10
	4.0-5.0	SA-26	Gravelly Sandy Silt	101	10

**TABLE 5-65**  
**ARSENIC CONCENTRATIONS IN SOILS ADJACENT TO THE FOOTPRINT OF THE**  
**FORMER FLUE FROM THE ROASTING OPERATIONS TO THE SMOKE STACKS**  
**(RI SAMPLING LOCATION EV-2-S)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
FSA	surface	EV-2-S	Brown fine coarse sand, some silt, some brick	660
	1.0	EV-2-S	As above	117
	2.0	EV-2-S	As above, with fragments of brick & slag	1,090
	3.0	EV-2-S	6" as above with increased white & green oxidation	1,687
	11.0	EV-2-S	Light brown/grey silt	7

**TABLE 5-66**  
**ARSENIC CONCENTRATIONS IN SOILS WITHIN THE FORMER FLUES FROM**  
**THE ARSENIC PROCESSING AREA TO THE STACKS**  
**(RI SAMPLING LOCATION S-28/SAIC-S28)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
FSA	surface	S-28	Topsoil, organic matter, sandy, red brick chips	3,010
		SAIC-S28	0.0-2.0"	1,190
	0.5	S-28	Brown silty sand, red brick, small gravels	5,620
		SAIC-S28		1,800
	1.0	S-28	Brown red, white silty sand with brick chips, smelter debris	14,740
		SAIC-S28		4,810
	2.0	S-28	Brown silty sand, red brick smelter debris	16,840
		SAIC-S28		6,230
	3.0	S-28	Tan, silty sand, small gravels	7,030
		SAIC-S28		6,020
	4.0	S-28	As above. Wet	7,480
	6.0	S-28	Tan silty sand, wet. Till started a 4.8'	6,240

**TABLE 5-67**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE VICINITY OF THE FORMER FLUES**  
**FROM THE ARSENIC PROCESSING AREA TO THE STACKS**  
**(RI SAMPLING LOCATION S-27/SAIC-S27)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
FSA	surface	S-27	Topsoil, organic material, sandy	390
		SAIC-S27	0.0-2.0"	2,600
	0.5	S-27	Brown silty sand, brick chips, small gravel	3,510
		SAIC-S27		2,090
	1.0	S-27	Tan sandy silt, small gravel	4,620
		SAIC-S27		3,010
	2.0	S-27	Brown silty sand, brick chips, black stains	5,306
		SAIC-S27		930
	3.0	S-27	Tan, silty sand, oxidized, small gravels	660
		SAIC-S27		1,880
	4.0	S-27	Tan, silty sand, oxidized	2,530
	6.0	S-27	Tan silty sand	2,480
	7.0	S-27	Light grey silt, soft, moist, small gravel	1,773
	9.0	S-27	Light grey silt, very dense, small gravel (till started at 8.0')	1,355

**TABLE 5-68**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE VICINITY OF THE FORMER STACKS**  
**(RI SAMPLING LOCATION S-36/SAIC-S36)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
FSA	surface	SAIC-S36	0.0 - 2.0" No log in RI	764
	0.5	SAIC-S36		1,100
	1.0	SAIC-S36		994
	2.0	SAIC-S36		1,420
	3.0	SAIC-S36		849
	4.0	S-36	Moist, light brown silt with small gravel and 5% brick fragments	3,260
	6.0	S-36	Moist light brown silt with gravel and brick fragments. Moist light gray silt at 6.5' with small gravel and no brick	775

**TABLE 5-69**  
**ARSENIC CONCENTRATIONS IN SOILS ADJACENT TO THE FOOTPRINT OF THE**  
**FORMER FLUES IN THE VICINITY OF THE STACKS**  
**(RI SAMPLING LOCATION S-72/SAIC-S72)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
FSA	surface	S-72	Topsoil, organic - rich	295
		SAIC-S72	0.0-2.0"	891
	0.5	S-72	As above	380
		SAIC-S72		1,140
	1.0	S-72	Brown sand, silty, organic - rich	1,300
		SAIC-S72		5,360
	2.0	S-72	Brown sand, silty, plus grey material	8,000
	3.0	S-72	Light brown sand, silty, brick fragments, grey material	21,200
		SAIC-S72		53,100
	4.0	S-72	Light brown sand, clayey, oxidation rust spots	5,400
	6.0	S-72	Grey, silt, sandy, clayey, pebbles	1,700
	7.0	S-72	Light grey silt, very dense, small gravel	489
	9.0	S-72	Light grey silt, very dense, dry, small gravel	263

**TABLE 5-70**  
**ARSENIC CONCENTRATIONS IN SOILS NEAR THE FORMER SOUTHERN FACILITY**  
**FENCELINE IN THE GENERAL VICINITY OF THE FORMER STACKS**  
**(RI SAMPLING LOCATION S-37/SAIC-S37)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
FSA	surface	SAIC-S37	0.0-2.0" Pre-RI sample: no sample description	857
	0.5	SAIC-S37		1,900
	1.0	SAIC-S37		1,550
	2.0	SAIC-S37		328
	3.0	SAIC-S37		99
	4.0	S-37	Moist, light gray silt, dense with gravel	18
	6.0	S-37	As above	5

**TABLE 5-71**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS TO THE SOUTH OF**  
**THE FOOTPRINTS OF THE FORMER FLUES TO THE STACKS**

Area	Sample Depth	RI Sampling Location SAIC-S29	RI Sampling Location SAIC-S30
FSA	surface	484	432
	0.5	935	203
	1.0	737	319
	2.0	488	338
	3.0	188	43

*Note: Samples collected during the pre-RI: no sample descriptions recorded.*

**TABLE 5-72**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE VICINITY OF THE FORMER FACILITY**  
**FENCELINE WEST OF THE FOOTPRINT OF A FORMER ROASTER FLUE**  
**(RI SAMPLING LOCATION S-34/SAIC-S34)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
FSA	surface	SAIC-S34	0.0-2.0" Pre-RI sample (no description)	276
	0.5	SAIC-S34	As above	312
	1.0	SAIC-S34	As above	415
	2.0	SAIC-S34	As above	1,550
	3.0	SAIC-S34	As above	1,160
	6.0	S-34	Slightly moist light brown silt with occasional gravels	118

**TABLE 5-73**  
**ARSENIC CONCENTRATIONS IN SUBSURFACE SOILS TO THE NORTH**  
**OF THE FOOTPRINTS OF THE FORMER FLUES AND STACKS**

Area	Sample Depth	RI Sampling Location SAIC-S25	RI Sampling Location SAIC-S26	RI Sampling Location SAIC-S35
FSA	surface	311	421	298
	0.5	146	800	435
	1.0	272	642	239
	2.0	80	80	727
	3.0	5	62	717

*Note: Samples collected during the pre-RI: no sample descriptions recorded.*

**TABLE 5-74**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT OF THE FORMER**  
**FLUE FROM THE DUST CHAMBERS TO THE STACKS**  
**(SAMPLING LOCATION TP-11A)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	TP-11A	Silty loam	3,148	101
	1.0-2.0	TP-11A	Smelter debris; trace red brick fragments	4,692	209
	2.0-3.0	TP-11A	Smelter debris; trace red brick fragments	12,893	558
	3.0-4.0	TP-11A	Smelter debris; brick	53,824	186
	4.0-5.0	TP-11A	Sand and silt	23,094	22

**TABLE 5-75**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT OF THE**  
**FORMER FLUE FROM THE NORTHERN ARSENIC KITCHEN TO THE STACKS AREA**  
**(SAMPLE LOCATION TP-11B)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	TP-11B	Silty loam	1,722	87
	1.0-2.0	TP-11B	Smelter debris; trace red brick	6,869	267
	2.0-3.0	TP-11B	Smelter debris; trace red brick	19,691	742
	3.0-4.0	TP-11B	Smelter debris; sand and brick	19,937	86
	4.0-5.0	TP-11B	Sand and silt	36,165	30
	5.0-6.0	TP-11B	Sand and silt	11,897	10
	6.0-7.0	TP-11B	Sand	8,408	11
	8.0-9.0	TP-11B	Sandy silt	1,450	10
	10.0-11.0	TP-11B	Sandy silt	504	10
	12.0-13.5	TP-11B	Sandy silt	212	10

**TABLE 5-76**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT OF THE**  
**FORMER FLUE FROM THE ARSENIC PROCESSING AREA TO THE STACKS**  
**(SAMPLE LOCATION TP-10A)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	TP-10-A	Silty loam	473	112
	1.0-2.0	TP-10-A	Smelter debris; red brick fragments	2,460	331
	2.0-3.0	TP-10-A	Smelter debris; red brick fragments	3,571	445
	3.0-4.0	TP-10-A	Smelter debris; red brick fragments	2,399	224
	4.0-5.0	TP-10-A	Smelter debris; red brick fragments (flue floor)	12,491	1,309
	5.0-6.0	TP-10-A	Sandy silt	2,209	20

**TABLE 5-77**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS WITHIN THE FOOTPRINT OF THE**  
**FORMER FLUE FROM THE ARSENIC PROCESSING AREA TO THE STACKS**  
**(SAMPLE LOCATION TP-10B)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	TP-10B	Smelter debris; red brick fragments	866	420
	1.0-2.0	TP-10B	Smelter debris; red brick fragments	1,356	268
	2.0-3.0	TP-10B	Smelter debris; red brick fragments	3,151	284
	3.0-4.0	TP-10B	Smelter debris; red brick fragments	3,277	298
	4.0-5.0	TP-10B	Smelter debris; red brick fragments	15,433	599
	5.0-6.0	TP-10B	Smelter debris; trace red brick frags	6,748	24
	6.0-7.0	TP-10B	Silty sand	453	10
	8.0-9.0	TP-10B	Silty sand	401	10
	10.0-11.0	TP-10B	Silty sand	490	10

**TABLE 5-78**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE VICINITY OF THE**  
**FOOTPRINT OF THE FORMER STACKS**  
**(SAMPLING LOCATION SA-13)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	SA-13	Sandy silt	846	281
	1.0-2.0	SA-13	Sandy silt	1,024	212
	2.0-3.0	SA-13	Sandy silt	13	12
	3.0-4.0	SA-13	Sandy silt	227	10
	4.0-5.0	SA-13	Sandy silt	42	10

**TABLE 5-79**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE VICINITY OF THE**  
**FOOTPRINT OF THE FORMER STACKS**  
**(SAMPLING LOCATION SA-14)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	SA-14	Sandy silt	11	10
	1.0-2.0	SA-14	Silty sand	10	10
	2.0-3.0	SA-14	Silty sand	10	13
	3.0-4.0	SA-14	Silty sand	10	10
	4.0-5.0	SA-14	Silty sand	10	10

**TABLE 5-80**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE VICINITY OF THE**  
**FOOTPRINT OF THE FORMER STACKS**  
**(SAMPLING LOCATION SA-15)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	SA-15	Silty sand	113	35
	1.0-2.0	SA-15	Silty sand	10	11
	2.0-3.0	SA-15	Silty sand	10	10
	3.0-4.0	SA-15	Silty sand	10	10
	4.0-5.0	SA-15	Silty sand	10	10

**TABLE 5-81**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE VICINITY OF THE**  
**FOOTPRINT OF THE FORMER STACKS**  
**(SAMPLING LOCATION SA-16)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	SA-16	Smelter debris	405	22
	1.0-2.0	SA-16	Smelter debris	51	10
	2.0-3.0	SA-16	Smelter debris	166	23
	3.0-4.0	SA-16	Silty sand	10	10
	4-0-5.0	SA-16	Silty sand	10	10

**TABLE 5-82**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE VICINITY OF THE**  
**FOOTPRINT OF THE FORMER STACKS**  
**(SAMPLING LOCATION SA-17)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	SA-17	Trace brick fragments	811	239
	1.0-2.0	SA-17	Trace brick fragments	610	103
	2.0-3.0	SA-17	Silty sand	10	10
	3.0-4.0	SA-17	Silty sand	10	10
	4-0-5.0	SA-17	Silty sand	10	10

**TABLE 5-83**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS**  
**IN THE VICINITY OF RI SAMPLING LOCATION S-34/SAIC-S34**  
**(SAMPLING LOCATION SA-18)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	SA-18	Silty loam	1,798	713
	1.0-2.0	SA-18	Silty sand	288	10
	2.0-3.0	SA-18	Silty sand	18	10
	3.0-4.0	SA-18	Sandy silt	10	10
	4-0-5.0	SA-18	Sandy silt	13	10

**TABLE 5-84**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(RI SAMPLING LOCATION S-114)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
NSA	surface	S-114	Black/brown topsoil/organic material, sandy, small gravels	375
	0.5	S-114	As above	290
	1.0	S-114	Brown sandy silt, some oxidation	55
	2.0	S-114	Brown silty sand, small gravels	55
	3.0	S-114	Tan, sandy clay, some oxidation, some water, small gravels	5
	4.0	S-114	Grey silty/clay, small gravels	7

**TABLE 5-85**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(RI SAMPLING LOCATION S-115)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
NSA	surface	S-115	Topsoil, sandy, some organic material, plastic liner	675
	0.5	S-115	Brown topsoil, sandy, some organic matter	725
	1.0	S-115	Brown topsoil, sandy, silty, some black clay stringers, some pebbles	350
	2.0	S-115	Tan, sandy clay & silt	8
	3.0	S-115	Tan, sandy clay, some oxidation stains	6
	4.0	S-115	Grey silty clay, some sand	8

**TABLE 5-86**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(RI SAMPLING LOCATION S-116)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
NSA	surface	S-116	Brown topsoil, organic material, sandy	350
	0.5	S-116	Brown, tan sandy/silt, small gravels	185
	1.0	S-116	Brown silty sand	76
	2.0	S-116	As above	69
	3.0	S-116	Brown silty clay	98
	4.0	S-116	Brown, silty, sand, wet	400

**TABLE 5-87**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(PRE-RI SAMPLING LOCATION SAIC-S73)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)
NSA	surface	SAIC-S73	71
	0.5	SAIC-S73	81
	1.0	SAIC-S73	85
	2.0	SAIC-S73	28
	3.0	SAIC-S73	27
	4.0	SAIC-S73	3

*\*No sample descriptions are available from the pre-RI sampling.*

**TABLE 5-88**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(RI SAMPLING LOCATION S-74/SAIC-S74)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)
NSA	surface	S-74	Dark brown fine sand/silt, root materials, small gravels	183
		SAIC-S74	0.0-2.0"	788
	0.5	S-74	As above	231
	1.0	S-74	Red brown fine sand/silt, small gravels	230
	2.0	S-74	As above	13
	3.0	S-74	As above. Moist	3
	4.0	S-74	Grey fine sand/silt, small gravels, dry	3

**TABLE 5-89**  
**ARSENIC AND LEAD CONCENTRATIONS MEASURED IN SOILS AT 211 MEDORA WAY**

ARSENIC																					
Sample Depth (inches)	FRONT YARD										BACK YARD										
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
0-2						280	202				151				387						
2-6						268	204				149				457						
0-6	64	1142	175	162	351			276	417	525		470	567	394		297	501	460	604	185	
6-12	46	825	347	67	396	316	259	385	1234	806	148	587	469	427	530	49	3252	605	966	201	
12-18	18U	28	189	18U	1215	300	18U	619	429	979	44	584	24	573	35	18U	645	428	194	181	
18-24	18U	18U	18U	18U	487	33	18U	1608	18U	4379	36	230	18U	157	18U	18U	20	28	18U	108	
24-30	18U	18U	18U	18U	39	18U	18U	668	18U	69	21	38	18U	18U	18U	18U	18U	18U	18U	101	
30-36	18U	18U	18U	18U	18U	18U	18U	59	18U	18U	18U	19	18U	18U	18U	18U	18U	18U	18U	2203	
LEAD																					
Sample Depth (inches)	FRONT YARD										BACK YARD										
	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10	
0-2						494	337				549				551						
2-6						422	166				645				664						
0-6	156	1557	306	278	538			430	626	794		611	488	603		479	595	593	744	367	
6-12	84	891	492	104	286	449	20U	489	1949	1202	565	753	410	652	742	60	3383	626	1078	325	
12-18	20U	27	251	20U	1027	288	20U	1044	208	1324	226	744	20U	671	27	20U	34	438	189	268	
18-24	20U	20U	20U	20U	34	33	20U	3075	20U	9439	131	273	20U	174	20U	20U	20U	20U	20U	103	
24-30	20U	20U	20U	20U	20U	20U	20U	23J	20U	38	69	27	20U	20U	20U	20U	20U	20U	20U	216	
30-36	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	20U	2866	

Concentrations are in mg/Kg

U = undetected

J = estimated value

**TABLE 5-90**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(SAMPLING LOCATION SA-19)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
NSA	0.0-1.0	SA-19	Silty loam	44	84
	1.0-2.0	SA-19	Silty loam	10	11
	2.0-3.0	SA-19	Silty sand	10	12
	3.0-4.0	SA-19	Silty sand	10	10
	4.0-5.0	SA-19	Silty sand	10	10

**TABLE 5-91**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(SAMPLING LOCATION SA-20)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
NSA	0.0-1.0	SA-20	Silty loam	589	1,123
	1.0-2.0	SA-20	Silty loam	837	1,390
	2.0-3.0	SA-20	Sandy silt	10	13
	3.0-4.0	SA-20	Sandy silt	10	14
	4.0-5.0	SA-20	Sandy silt	10	10

**TABLE 5-92**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(SAMPLING LOCATION SA-21)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
NSA	0.0-1.0	SA-21	Silty loam	275	323
	1.0-2.0	SA-21	Silty loam	331	387
	2.0-3.0	SA-21	Sandy silt with trace brick fragments	290	344
	3.0-4.0	SA-21	Sandy silt with trace brick fragments	104	140
	4.0-5.0	SA-21	Silty sand	10	10

**TABLE 5-93**  
**ARSENIC CONCENTRATIONS IN SOILS IN THE NORTHERN SMELTER AREA**  
**(SAMPLING LOCATION SA-22)**

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
NSA	0.0-1.0	SA-22	0.0-0.5' Asphalt 0.5-1.0' Sand and gravel	37	10
	1.0-2.0	SA-22	Sand and gravel	20	10
	2.0-3.0	SA-22	Sandy silt	20	11
	3.0-4.0	SA-22	Sandy silt	30	50
	4.0-5.0	SA-22	Gravelly silt	10	10

**TABLE 5-94**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-1)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-1	91	1,221
	0.5-1.0	HA-1	159	3,582
	2.0-2.5	HA-1	10	11
	4.0-4.5	HA-1	10	10

**TABLE 5-95**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-2)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-2	11	1,003
	0.5-1.0	HA-2	11	539
	2.0-2.5	HA-2	21	331
	4.0-4.5	HA-2	52	219

**TABLE 5-96**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-3)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-3	16	686
	0.5-1.0	HA-3	16	1,049
	2.0-2.5	HA-3	296	323
	4.0-4.5	HA-3	389	758

**TABLE 5-97**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-4)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-4	30	925
	0.5-1.0	HA-4	20	338
	2.0-2.5	HA-4	10	59
	4.0-4.5	HA-4	10	10

**TABLE 5-98**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-5)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-5	10	14
	0.5-1.0	HA-5	10	10
	2.0-2.5	HA-5	10	10
	4.0-4.5	HA-5	10	10

**TABLE 5-99**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-6)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-6	11	738
	0.5-1.0	HA-6	10	160
	2.0-2.5	HA-6	10	13
	4.0-4.5	HA-6	10	166

**TABLE 5-100**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-7)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-7	15	295
	0.5-1.0	HA-7	15	276
	2.0-2.5	HA-7	21	351

**TABLE 5-101**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-8)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-8	20	755
	0.5-1.0	HA-8	18	20
	2.0-2.5	HA-8	10	190
	4.0-4.5	HA-8	10	10

**TABLE 5-102**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-9)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-9	10	21
	0.5-1.0	HA-9	10	21
	2.0-2.5	HA-9	10	23
	4.0-4.5	HA-9	10	10

**TABLE 5-103**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-10)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-10	22	793
	0.5-1.0	HA-10	10	174
	2.0-2.5	HA-10	10	80
	4.0-4.5	HA-10	349	1,039

**TABLE 5-104**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-11)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-11	10	852
	0.5-1.0	HA-11	25	688
	2.0-2.5	HA-11	10	27
	4.0-4.5	HA-11	20	183

**TABLE 5-105**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-12)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-12	21	1,086
	0.5-1.0	HA-12	10	181
	2.0-2.5	HA-12	215	7,186
	4.0-4.5	HA-12	10	13

**TABLE 5-106**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-13)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-13	10	25
	0.5-1.0	HA-13	10	26
	2.0-2.5	HA-13	10	10
	4.0-4.5	HA-13	10	12

**TABLE 5-107**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-14)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-14	12	633
	0.5-1.0	HA-14	20	62
	2.0-2.5	HA-14	10	10
	4.0-4.5	HA-14	45	40

**TABLE 5-108**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-15)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-15	17	780
	0.5-1.0	HA-15	32	1,439
	2.0-2.5	HA-15	12	56
	4.0-4.5	HA-15	10	1,236

**TABLE 5-109**  
**ARSENIC AND LEAD CONCENTRATIONS IN SOILS IN THE STATE ROUTE 529 OVERPASS AREA**  
**(SAMPLING LOCATION HA-16)**

Area	Sampling Depth (feet)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-16	19	641
	0.5-1.0	HA-16	32	625
	2.0-2.5	HA-16	10	16
	4.0-4.5	HA-16	19	15

**TABLE 5-110**  
**ARSENIC AND LEAD CONCENTRATIONS IN SURFACE SOILS**  
**IN THE FORMER ROASTING OPERATIONS AREA**

Area	Sampling Depth (inches)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	0-2	SAIC-S5	6,890	2,150
	0-2	SAIC-S6	138	289
	0-2	SAIC-S7	480	772
	0-2	SAIC-S23	475	1,500
	0-2	SAIC-S78	1,460	827

**TABLE 5-111**  
**ARSENIC AND LEAD CONCENTRATIONS IN SURFACE SOILS IN THE FORMER**  
**BLAST FURNACE/LEAD REFINING OPERATIONS AREA**

Area	Sampling Depth (inches)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	0-2	SAIC-S60	23	666
	0-2	SAIC-S61	80	4,540
	0-2	SAIC-S70	51	217
	0-2	SAIC-S71	333	630
	0-2	SAIC-S81	54	67
	0-2	SAIC-S82	55	89
	0-2	SS-8	345	209

**TABLE 5-112**  
**ARSENIC AND LEAD CONCENTRATIONS IN SURFACE SOILS**  
**IN THE FORMER ARSENIC PROCESSING AREA**

Area	Sampling Depth (inches)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0-2	SAIC-S16	732	220
	0-2	SAIC-S18	131	190
	0-2	SAIC-S44	341	209
	0-2	SAIC-S49	2,010	233
	0-2	SS-5	541	480
	0-24	SS-6	131	34
	0-2	SS-9	182	87

**TABLE 5-113**  
**ARSENIC AND LEAD CONCENTRATIONS IN SURFACE SOILS**  
**IN THE GENERAL AREA OF FORMER STACKS**

Area	Sampling Depth (inches)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0-2	SAIC-S33	240	96
	0-2	SS-10	381	257
	0-24	SS-11	4,670	425
	0-2	SS-12	864	864

**TABLE 5-114**  
**ARSENIC AND LEAD CONCENTRATIONS IN SURFACE SOILS**  
**IN THE NORTHERN SMELTER AREA**

Area	Sampling Depth (inches)	Location	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
NSA	0-2	SAIC-S62	90	150
	0-2	SAIC-S75	8,080	386
	0-2	SAIC-S76	556	419
	0-2	SAIC-S79	34	72
	0-2	SAIC-80	40	152
	0-2	SS-13	476	688

## 6.0 FINDINGS OF SPECIALIZED SMELTER AREA EVALUATIONS

### 6.1 BIOASSAY TESTING

Bioassay testing was performed on selected samples to evaluate whether or not the material would meet the toxicity criteria specified in WAC 173-303-100 for dangerous waste (DW) or extremely hazardous waste (EHW). The samples were collected and analyzed in accordance with WAC 173-303-110. The SAP required that a sample containing flue dust and a sample containing arsenic trioxide be selected from the following arsenic concentration ranges for bioassays:

500 - 1,000 mg/Kg

1,000 - 3,000 mg/Kg

3,000 - 5,000 mg/Kg

5,000 - 10,000 mg/Kg

10,000 - 20,000 mg/Kg

Upon completion of sample collection and total arsenic analyses by XRF (and prior to data validation), the following samples were selected for bioassays:

#### Samples Containing Residual Arsenic Trioxide

Sample No.	Location	Total Arsenic (mg/Kg)
EVT-9803-129	TP5, 3-4'	827
EVT-9803-113	TP4, 1-2'	1,981
EVT-9803-116	TP4, 4-5'	4,724
EVT-9803-114	TP4, 2-3'	8,799
EVT-9803-107	TP6A, 1-2'	12,487

Samples Containing Residual Flue Dust

Sample No.	Location	Total Arsenic (mg/Kg)
EVT-9803-143	TP8, 5-6'	564
EVT-9803-132	TP7, 0-1'	2,220
EVT-9803-140	TP8, 2-3'	4,619
EVT-9803-122	TP9, 3-4'	7,821
EVT-9803-135	TP7, 3-4'	10,644

The selected ten samples were submitted to Parametrix, Inc. in Kirkland, Washington for bioassay analyses. Parametrix performed the bioassays in accordance with Ecology's guidelines in Method 80-12 using *Oncorhynchus mykiss* rainbow trout with a 96 hour exposure duration. The bioassays were conducted at the 100 mg/L and 10 mg/L concentrations in order to determine if the samples should be classified as dangerous or extremely hazardous waste. The laboratory report is provided as Appendix E. No mortality occurred in any of the samples tested. Based on these results none of the materials tested would be classified as State Dangerous Waste or Extremely Hazardous Waste. This is discussed further in Section 7.1.

## 6.2 SYNTHETIC PRECIPITATION LEACHING PROCEDURE TESTS

As specified in the SAP, four samples were tested by the Synthetic Precipitation Leaching Procedure (SPLP). The SPLP test is designed to simulate leaching from materials in the environment, when exposed to rainfall. The results of the SPLP tests are shown in Table 6-1.

**TABLE 6-1**  
**SYNTHETIC PRECIPITATION LEACHING PROCEDURE TEST RESULTS**

Sample Identification	Depth (Feet)	Description	Total Arsenic Concentration (mg/Kg)	SPLP Arsenic Concentration (mg/L)
TP5	1 - 2	Smelter debris containing residual arsenic trioxide	5,370	27.0
TP6A	1 - 2	Smelter debris containing residual arsenic trioxide	12,487	7.0
TP7	3 - 4	Smelter debris containing residual roasting plant flue dust	10,644	9.1
TP8	4 - 5	Smelter debris containing residual roasting plant flue dust	4,699	8.6

### 6.3 EVALUATION OF THE EXTENT OF UNWEATHERED GLACIAL TILL

Previous investigations identified the unweathered glacial till as a significant barrier to vertical migration of arsenic in the former smelter area. These investigations demonstrated that the till is present throughout and adjacent to the smelter and its presence likely promotes the lateral flow of ephemeral perched water, if any, in the upper, weathered portion of the till toward the east. All of the 31 deeper soil borings in the upland area completed prior to this smelter area investigation penetrated the till to the unweathered section. The unweathered till, which is characterized by greater density, is typically encountered at a depth of less than five feet below the top of the till layer. The till outcrops (or subcrops) along the slope near the eastern boundary of the former smelter area (east side of East Marine View Drive).

The following additional data needs relative to the extent of the unweathered till and its potential effects on groundwater flow and contaminant transport were addressed by the smelter area investigation:

- Install three borings on the east side of East Marine View Drive opposite wells EV-10, EV-11 and EV-13 to more accurately delineate the eastern boundary of the till and to further characterize the nature and extent of arsenic in soils.
- Install one boring near the western side of the smelter site to confirm the thickness of the till.

### 6.3.1 Geologic Findings

Borings TB-1, TB-2 and TB-3 were completed along the eastern edge of East Marine View Drive opposite monitoring wells EV-13, EV-3 (and EV-11) and EV-10 (Figures 5-2 and 5-3). The boring logs are presented in Appendix B. The borings were advanced through the glacial till and several feet into the glacial outwash sand deposit that underlies the till. The base of the till was encountered at a depth of 33 feet in all three borings. Fill material and reworked glacial till (silt, sandy silt or silty sand) are present to depths of 11 to 15 feet overlying the undisturbed till at borings TB-1, TB-2 and TB-3. The undisturbed till is composed of sandy silt, silt, sand and sand and gravel. The upper few feet of outwash sands encountered at the base of borings TB-1, TB-2 and TB-3 was characterized as dry to moist, indicating unsaturated conditions. These conditions are consistent with those observed at EV-3, where approximately the upper 20 to 22 feet of the outwash sands are unsaturated.

Boring TB-4 was completed near the western boundary of the smelter site to a depth of 91.5 feet (Figure 5-4). The log for TB-4 is presented in Appendix B. The boring did not penetrate the base of the till. The till, which is at least 90 feet thick at this location, is comprised predominantly of medium dense to hard sandy silt, clayey silt and silt with some sand layers. The upper few feet of till were characterized as dense wet sandy silt, which overlies dry, hard sand. Saturated sand

approximately four feet thick was encountered at a depth of 39 to 43 feet below ground, within the till unit.

The principal finding of the geologic evaluation is that unweathered till is present at locations TB-1, TB-2 and TB-3. The till therefore extends further east than previously identified. This information will be augmented by additional investigation to be performed in the near future in the lowland area (see Section 8.2).

#### 6.3.2 Soil Chemical Results

Soil samples collected from borings TB-1, TB-2 and TB-3 were analyzed for total arsenic and lead. The samples submitted for analysis were typically from the following depth intervals in feet below ground surface: 0-0.5, 2-3.5, 5-6.5 and every 5 feet thereafter to total depth. A comparison of the arsenic results for these borings with the data from borings drilled during previous investigations on the west side of East Marine View Drive indicates that concentrations generally decrease substantially from west to east toward the embankment above the lowland. For instance at TB-1, concentrations are highest between about 10 and 16 feet (455 to 695 mg/Kg). Across the street to the west, arsenic concentrations at EV-13 range from 1,831 to 11,810 mg/Kg in the interval from 2 to 11.5 feet (the total depth of the boring). Similarly, arsenic values peak at 660 mg/Kg at 10 to 11.5 feet in TB-3 versus a range of 773 to 7,660 mg/Kg at EV-10 in the depth interval of 2 to 10.5 feet (west side of street). This relationship is less obvious at TB-2, which is east of EV-3 and EV-11.

There are some indications of downward migration of arsenic in soil, particularly at TB-1, where the arsenic concentration decreases with depth to 76 mg/Kg in the outwash sand at 35-36.5 feet, and TB-3, where the arsenic concentration in the outwash sand at 37.5-39 feet is 291 mg/Kg.

The information provided by this portion of the smelter area investigation will be augmented by additional data to be generated in the upcoming lowland investigation. One of the goals of the lowlands investigation is to fill gaps in the current understanding of conditions and to increase understanding of the relationship between former smelter area sources in the upland and arsenic concentrations in groundwater in the lowlands. The lowlands investigation is discussed further in Section 8.2.

## **7.0 NATURE AND EXTENT OF MATERIALS OF INTEREST**

The Enforcement Order required a characterization of soils and other materials at the former smelter area that would be classified as extremely hazardous waste (EHW), state dangerous waste (State DW), or federally designated hazardous waste (HW) if generated (i.e., excavated during remediation). Extremely hazardous and dangerous waste are defined as those dangerous, extremely hazardous, or mixed wastes designated in WAC 173-303-070 through 173-303-100. For the purpose of the smelter area investigation, DW can be one of two categories that include State DW or federally designated hazardous waste. EHW and State DW can be determined from book designation or bioassay designation. Classification as federally designated hazardous waste is based on the results from the Toxicity Characteristic Leaching Procedure (TCLP).

### **7.1 EXTREMELY HAZARDOUS AND STATE DANGEROUS WASTE**

#### **7.1.1 Book Designation**

WAC 173-303-100 describes the book designation procedure for determining if a solid waste is an EHW or State DW. The regulation identifies two groups of EHW and State DW that include toxic or persistent wastes. For the chemicals of interest in the former smelter area, the persistent group does not apply because it is defined as waste with halogenated hydrocarbons or polycyclic aromatic hydrocarbons (WAC 173-303-100 (6)).

WAC 173-303-100 (5)(b) details two steps to determine if a waste is EHW or State DW by book designation. The first step is to assign the toxic category (A, B, C, or D) of the chemical defined in the Toxic Category Table (WAC 173-303-100 (5)(b)(i)). The NIOSH RTECS indicates that the oral rat LD<sub>50</sub> values for arsenic and arsenic trioxide are 763 mg/Kg and 14.6 mg/Kg respectively which places arsenic in toxic category D and arsenic trioxide in toxic category B.

Toxicity data for lead, as defined in the Toxic Category Table, could not be identified in NIOSH RTECS. This toxicity data includes fish LC50, oral rat LD50, inhalation rat LC50, or dermal rabbit LD50. Although WAC 173-303-100 (5)(b)(i) states "If toxicity data for a constituent cannot be found in the NIOSH RTECS, or other source reasonably available to a person, then the toxic category need not be determined for that constituent", an evaluation of other toxicity data was made so a toxic category (A, B, C, or D) could be assigned to lead for the purpose of this report. A toxicity criteria that is available for lead that may be similar to oral rat LD50 is oral pigeon LDLo. The LD50 is death that is statistically determined for acute exposure time while LDLo is death for acute or chronic exposure time. Therefore, the LDLo dose is more conservative than the LD50 calculated dose. The LDLo of lead for oral pigeon is 160 mg/Kg which places it in toxic category C.

The second step involves using a specific formula based on the toxic category (WAC 173-303-100 (5)(b)(ii)). For the purposes of the smelter area investigation, the objective is to determine the minimum concentration that classifies a waste as EHW or State DW rather than evaluating if a waste with a known percentage of a chemical is an EHW or State DW. Therefore, the minimum allowed equivalent concentrations for EHW and State DW, 1% and 0.001% respectively, are converted to mg/Kg and the minimum concentrations for classification are back calculated from the general formula provided WAC 173-303-100 (5)(b)(ii).

The following lists the formulas used to determine the minimum concentration for classification as EHW and State DW for arsenic, arsenic trioxide, and lead:

Arsenic - EHW  
Toxic Category D

X = waste concentration equaling  
equivalent concentration (EC) of 1%

Arsenic - State DW  
Toxic Category D

X = waste concentration equaling  
equivalent concentration (EC) of  
0.001%

$$EC = 1\% = 10,000 \text{ mg/Kg} = X/10,000$$

$$10,000 \text{ mg/Kg} = X/10,000$$

multiply both sides of equation by 10,000

$$(10,000)10,000 \text{ mg/Kg} = X/10,000(10,000)$$

$$10,000 \times 10,000 \text{ mg/Kg} = X$$

$$X = 100,000,000 \text{ mg/Kg}$$

note: X is greater than 100%

#### Arsenic Trioxide - EHW

##### Toxic Category B

X = waste concentration equaling  
equivalent concentration (EC) of 1%

$$EC = 1\% = 10,000 \text{ mg/Kg} = X/100$$

$$10,000 \text{ mg/Kg} = X/100$$

multiply both sides of equation by 100

$$(100)10,000 \text{ mg/Kg} = X/100(100)$$

$$100 \times 10,000 \text{ mg/Kg} = X$$

$$X = 1,000,000 \text{ mg/Kg}$$

note: X is 100%

$$EC = 0.001\% = 10 \text{ mg/Kg} = X/10,000$$

$$10 \text{ mg/Kg} = \textcircled{X/10,000} \text{ for toxic Category D}$$

multiply both sides of equation by 10,000

$$(10,000)10 \text{ mg/Kg} = X/10,000(10,000)$$

$$10,000 \times 10 \text{ mg/Kg} = X$$

$$X = 100,000 \text{ mg/Kg}$$

#### Arsenic Trioxide - State DW

##### Toxic Category B

X = waste concentration equaling  
equivalent concentration (EC) of  
0.001%

$$EC = 0.001\% = 10 \text{ mg/Kg} = X/100$$

$$10 \text{ mg/Kg} = \textcircled{X/100} \text{ for toxic Category B}$$

multiply both sides of equation by 100

$$(100)10 \text{ mg/Kg} = X/100(100)$$

$$100 \times 10 \text{ mg/Kg} = X$$

$$X = 1,000 \text{ mg/Kg}$$

To remain consistent with previous Ecology interpretations, arsenic trioxide is 76% arsenic and therefore, the resulting arsenic, as a total concentration, is 76% of the calculated value for arsenic trioxide concentrations.

Lead - EHW

Toxic Category C

X = waste concentration equaling  
equivalent concentration (EC) of 1%

$$EC = 1\% = 10,000 \text{ mg/Kg} = X/1000$$

$$10,000 \text{ mg/Kg} = X/1000$$

multiply both sides of equation by 1000

$$(1000)10,000 \text{ mg/Kg} = X/100(1000)$$

$$1000 \times 10,000 \text{ mg/Kg} = X$$

$$X = 10,000,000 \text{ mg/Kg}$$

note: X is greater than 100%

Lead - State DW

Toxic Category C

X = waste concentration equaling  
equivalent concentration (EC) of  
0.001%

$$EC = 0.001\% = 10 \text{ mg/Kg} = X/1000$$

$$10 \text{ mg/Kg} = X/1000$$

multiply both sides of equation by 1000

$$(1000)10 \text{ mg/Kg} = X/1000(1000)$$

$$1000 \times 10 \text{ mg/Kg} = X$$

$$X = 10,000 \text{ mg/Kg}$$

The following summarizes the minimum concentrations for a waste to be EHW or State DW by using book designation:

<u>Chemical</u>	<u>EHW Concentration (mg/Kg)</u>	<u>Waste Number</u>
Arsenic	*	
Arsenic Trioxide	1,000,000 (760,000 as As)	WT01
Lead	*	

<u>Chemical</u>	<u>State DW Concentration (mg/Kg)</u>	<u>Waste Number</u>
Arsenic	100,000	WT02
Arsenic Trioxide	1,000 (760 as As)	WT02
Lead	10,000	WT02

note: \* indicated concentration is greater than 100%

### 7.1.2 Bioassay Designation

The DW bioassay requirements are listed in WAC 173-303-100 (5)(c)(i). The regulations state that "to determine if a waste is DW, a person must establish the toxicity category range of a waste by means of the 100 mg/L acute static fish test or the 5,000 mg/Kg oral rat test, as described in the biological testing methods (bioassays) adopted in WAC 173-303-110(3)."

The EHW bioassay requirements are listed in WAC 173-303-100 (5)(c)(ii). The regulations state that "to determine if a waste is EHW, a person must establish the toxicity category range of a waste by means of the fish bioassay at 10 mg/L or the rat bioassay at 50 mg/L, as described in the biological testing methods (bioassays) adopted in WAC 173-303-110(3)." *mg/kg?*

WAC 173-303-100 (5)(d) states that "If the designation acquired from book designation and bioassay do not agree, then bioassay data will be used to designate a waste."

Ten samples containing arsenic concentrations ranging from approximately 500 to 12,500 mg/Kg (see Section 6.1) were submitted to Parametrix, Inc. in Kirkland, Washington for bioassay analyses. Parametrix performed the bioassays in accordance with Ecology's guidelines in Method 80-12 using *Oncorhynchus mykiss* rainbow trout with a 96 hour exposure duration. The bioassays were conducted at the 100 mg/L and 10 mg/L concentrations in order to determine if the samples should be classified as dangerous waste or extremely hazardous waste, respectively. Bioassay results (see Appendix E) show that no mortality occurred at either concentration for any of the samples. Therefore, the samples are not classified as either DW or EHW.

To confirm that the XRF analyses were accurate for the bioassays, the remaining portion of samples EVT-9803-107 and EVT-9803-135 were shipped to Sound Analytical in Fife, Washington for wet chemistry analysis by Parametrix upon completion of bioassay testing. Results indicate arsenic concentrations of 10,000 and 9,700 mg/Kg for EVT-9803-107 and EVT-9803-135,

respectively. These results compare favorably with the XRF results that indicated arsenic concentrations of 12,487 and 10,644 mg/Kg.

In summary, the most conservative book designation for EHW is 760,000 mg/Kg for arsenic based on arsenic trioxide. Bioassay results, which supersede book designation, indicate that EHW and DW levels are somewhere above 10,000 mg/Kg.

## 7.2 FEDERALLY DESIGNATED HAZARDOUS WASTE

WAC 173-303-090 sets forth characteristics which a solid waste might exhibit and would cause that waste to be a federally designated hazardous waste (HW). WAC 173-303-090 (8) identifies criteria for toxicity characteristics which includes the chemicals of interest at the former smelter area. The Toxicity Characteristic Leaching Procedure (TCLP) is the required test on a waste extract. A solid waste would be classified as a federally designated hazardous waste if an extract from a representative sample of the waste contained arsenic or lead at concentrations above those listed below:

<u>Chemical</u>	<u>Concentration (mg/L)</u>	<u>HW Number</u>
Arsenic	5.0	D004
Lead	5.0	D008

Asarco submitted a TCLP Criterion Work Plan to Ecology on May 22, 1996 to supplement TCLP data collected during the Everett Smelter Site RI. On July 12, 1996, a summary of the TCLP evaluation was submitted to Ecology (see Appendix F). The arsenic evaluation consisted of analyzing 22 soil samples that were archived from the Everett Smelter Site RI for TCLP arsenic. The selected samples consisted of a range of previously analyzed total arsenic concentrations (approximately 600 mg/Kg to 4,000 mg/Kg) which are summarized in the following table:

**TABLE 7-1**  
**RESULTS OF PREVIOUS TCLP TESTING STUDY**

Sample Number	Total Arsenic (mg/Kg)	TCLP Arsenic (mg/L)
EVT-9512-920	626	0.61
EVT-9512-927	668	0.48
EVT-9512-903	865	1.10
EVT-9512-910	884	0.45
EVT-9512-932	957	0.29
EVT-9512-918	1285	0.73
EVT-9512-913	1449	1.80
EVT-9512-928	1584	1.00
EVT-9512-915	1649	0.51
EVT-9512-929	1724	1.30
EVT-9512-939	1814	1.50
EVT-9512-933	1940	3.90
EVT-9512-917	2099	2.20
514 Pilchuck	2328	2.10
EVT-9512-914	2793	2.50
EVT-9302-202	2906	3.70
EVT-9512-930	3113	2.10
EVT-9512-905	3223	5.30
EVT-9512-908	3616	3.10
520 E. Marine Drive	3666	13.00
EVT-9512-925	3849	4.10
EVT-9512-924	4066	1.70

A diagram is included in Appendix F that shows the plot of a regression line generated from the laboratory results. A total soil concentration of 3,000 mg/Kg of arsenic corresponding to the upper 95% confidence limit has been calculated as a threshold concentration above which soils might exceed the TCLP standard of 5 mg/L.

### 7.3 EXTENT AND VOLUME ESTIMATE OF MATERIALS OF INTEREST

Sections 7.1 and 7.2 described the criteria for designating waste categories of smelter residuals/soils containing arsenic and/or lead. Based on the current data, minimum arsenic concentrations which would result in material being classified as the waste categories if excavated are:

- EHW - 760,000 mg/Kg arsenic.
- State DW - some value greater than 10,000 mg/Kg arsenic (value to be determined by future bioassay testing).
- HW - 3,000 mg/Kg arsenic.

These values are used to estimate the extent and volume of material for each waste category including EHW, State DW, and HW. All data collected to date for the former smelter area including data from the pre-RI, RI, and the recent smelter area investigation were used for the evaluations.

#### 7.3.1 Extremely Hazardous Waste

Based on current data, no EHW (i.e., arsenic concentrations greater than 760,000 mg/Kg) has been identified in the former smelter area.

#### 7.3.2 State Dangerous Waste

Although the State DW threshold concentration for arsenic was not defined by the recent testing, the extent and estimated volume of material with arsenic concentrations above 10,000 mg/Kg have been identified (see Figure 7-1). The extent of material with concentrations greater than

10,000 mg/Kg is within the fenced area except for a small area on the northeast corner near the intersection of 5<sup>th</sup> Street and East Marine View Drive (sample location EV-13).

As expected, the majority of the material with arsenic concentrations greater than 10,000 mg/Kg is in the former arsenic processing area within footprints of former structures and in demolition debris present in immediately adjacent areas. The remaining areas with arsenic concentrations greater than 10,000 mg/Kg generally are primarily associated with the footprints and adjacent debris areas of: 1) the flue from the dust chambers in the former blast furnace/lead refining area; 2) the southern flue from the roaster in the former roasting operations area; and 3) the flues in the former stack area.

Based on the available data, the estimated volume of material containing arsenic concentrations greater than 10,000 mg/Kg is approximately 10,000 to 15,000 cubic yards. This material is contained within the fenced area with the exception of a small area between the fence and East Marine View Drive near 5<sup>th</sup> Street (sample location EV-13) which is estimated to contain approximately 100 cubic yards. These volumes were estimated based on the following assumptions:

- Material will be excavated approximately one foot below the identified depth of material containing arsenic concentrations greater than 10,000 mg/Kg.
- Maximum depth in each structure is uniform.
- Material with arsenic extends approximately three feet beyond the identified structure, such as a flue.
- Debris in areas where samples were not collected had the same lateral characteristics as in adjacent areas which were sampled.
- Material with arsenic above 10,000 mg/Kg extends vertically to depth with no taper.
- Area of houses with full basements is excluded.

- An isolated area near SA-4 has been excluded.

A range is given for the estimates based on the following principal uncertainties:

- Maximum depth to material less than 10,000 mg/Kg in structures may not be uniform.
- Cut and fill operations have introduced significant heterogeneity.

### 7.3.3 Federally Designated Hazardous Waste

Figure 7-2 shows the estimated extent of material with concentrations greater than 3,000 mg/Kg is mostly within the fenced area except for a small area that extends beneath the western portion of East Marine View Drive.

As expected, the majority of the material with arsenic concentrations greater than 3,000 mg/Kg is in the former arsenic processing area and within and adjacent to the footprints of: 1) the former flue from the dust chambers in the former blast furnace/lead refining area; 2) the former flues from the roaster and dust chamber in the former roasting operations area; and 3) the former flues in the former stack area.

Based on the available data, the estimated volume of material containing arsenic concentrations greater than 3,000 mg/Kg within the fenced area is between 20,000 and 25,000 cubic yards. This material is contained within the fenced area with the exception of a small area adjacent to and under East Marine View Drive, which is estimated to contain approximately 600 cubic yards. These volumes were estimated based on the following assumptions:

- Material will be excavated approximately one foot below the identified depth of material containing arsenic concentrations greater than 3,000 mg/Kg.
- Maximum depth in each structure is uniform.

- Material with arsenic extends approximately three feet beyond the identified structure, such as a flue.
- Debris in areas where samples were not collected had the same lateral characteristics as in adjacent areas which were sampled.
- Material with arsenic above 3,000 mg/Kg extends vertically to depth with no taper.
- Area of houses with full basements is excluded.
- Isolated areas near SAIC-75 and 02-B1-01 in the northern portion of the former smelter area near Medora Way have been excluded.

A range is given for the estimates based on the following principal:

- Maximum depth to material less than 3,000 mg/Kg in structures may not be uniform.
- Cut and fill operations have introduced significant heterogeneity.

#### 7.4 RESIDUAL SMELTER MATERIALS CONTAINING FLUE DUST AND ARSENIC TRIOXIDE

In addition to identifying those materials that may be classified in waste categories if excavated, the Enforcement Order requires the identification of "the nature and extent of... any other soils or material that may be a contaminant source for surface water and groundwater in and adjacent to the smelter site."

In general, the higher the arsenic concentration in a material, the higher its potential to act as a source. For groundwater a combination of high arsenic concentration, high volume of material and significant infiltrating water will generally result in a source of arsenic to underlying soils and potentially to groundwater. The findings of the smelter area investigation and previous studies show that smelter materials containing residual arsenic trioxide and flue dust are the principal potential sources of arsenic to groundwater. As noted previously these smelter materials are

present in subsurface soils in the fenced area within the footprints of former smelter structures where they were handled, processed or stored (in particular, former flues, dust chambers and arsenic processing operations). The extent and depth of these smelter materials was developed based on observations made during the smelter area investigation, descriptions of samples collected and lead/arsenic concentrations and is shown on Figure 7-3. The further investigation of site groundwater conditions, including evaluation of fate and transport, will be completed as part of the supplemental lowlands investigation, which will begin late this summer (see Section 8.2).

Surface water data collected to date (Asarco, 1998b) indicate that soils or materials affecting surface water quality are primarily restricted to the southern part of the former smelter footprint (i.e., within the fenced area). A major objective of the Storm Water and Storm Drain Sediment Characterization and Controls Program, currently in progress, is to characterize the concentrations of arsenic and metals in surface water runoff from the former smelter property and adjacent areas. These data would then be used to identify key source areas and to guide implementation of Best Management Practices (BMPs), which may include source area controls, to ameliorate these discharges. For surface water, high arsenic concentrations in shallow soils in key areas relative to surface drainage patterns would likely be the major source. In addition, erosion of soils may also be important. These factors are being evaluated in the referenced storm water study. The surface water data will also be used in the site-wide evaluation of fate and transport.

## **8.0 SUMMARY OF FINDINGS AND FUTURE INVESTIGATIONS**

### **8.1 SUMMARY OF SMELTER AREA INVESTIGATION FINDINGS**

The smelter area investigation was performed to meet the requirements specified in Enforcement Order No. DE97TC-N119 issued by the Washington Department of Ecology. Details of the investigation were developed based on the requirements of the Enforcement Order and also on discussions during a series of mediation meetings among Ecology, Asarco, the City of Everett, various citizens groups and other interested parties. These meetings were intended, in part, to identify and evaluate comprehensive cleanup actions for the entire site, including the former smelter area. To meet the information needs identified during mediation, the scope of the smelter area investigation was expanded from the requirements of the Enforcement Order to include sampling west of State Route 529 into the residential area around Medora Way. It also included additional sampling of material used as fill beneath the State Route 529 overpass and an evaluation of the extent of till to provide additional information of possible migration pathways for arsenic in groundwater from the upland to lowland portion of the site. The scope of the investigation also considered data being collected as part of the concurrent storm water and lowlands investigations.

Soil samples were collected at 60 locations to depths up to 39 feet during the smelter area investigation. Samples were analyzed for total arsenic and lead. Selected samples were also tested for leachability and toxicity. Sampling locations were identified based on a variety of information sources, including: (1) historical maps of the smelter which showed location of operations units; (2) documentary information on the nature of the different materials handled and processed by the smelter in each area; (3) documentary information on smelter demolition and subsequent development (including residential and right-of-way); (4) a series of aerial photographs beginning in 1941 showing development activities; and (5) data from previous soil, groundwater and surface water investigations.

Per the program objectives, the smelter area investigation has provided further characterization regarding the nature and extent of elevated concentrations of arsenic and lead associated with the residual materials from the smelter demolition and subsequent redevelopment of the property. From a practical perspective an overarching goal of the investigation was to characterize the location of smelter residuals with respect to the fenced area and immediately surrounding areas. Identification of the nature and extent of these residuals is important from the perspective of evaluating potential waste categories and also in the evaluation of sources of arsenic to groundwater and surface water. Therefore the sampling and analyses were designed to provide important information not only regarding the residual contamination associated with the historical smelter footprint, but also additional detail as to whether residuals are present outside of the historical footprint due to redevelopment which occurred after the smelter closed. In order to address these issues, samples were collected from within the currently fenced portion of the historical smelter footprint, portions of the historical smelter footprint outside of the fenced area, and from outside the perimeter of the historical smelter footprint. The investigation was implemented to gather as much pertinent information as possible. Rapid turnaround time by the analytical lab allowed for deeper samples to be collected at locations where arsenic concentrations were still high in the maximum depth proposed in the SAP.

The objectives of the smelter area investigation, as stated in the Enforcement Order were:

"to identify the nature and extent of extremely hazardous waste, federally designated hazardous waste, state dangerous waste, and any other soils or material that may be a contaminant source for surface and groundwater in and adjacent to the smelter site. The smelter area is defined as the former smelter property east of State Route 529. Asarco shall conduct an investigation to determine the location and volumes of material in the waste categories listed above."

The information collected and data generated through the recent smelter area investigation was combined with all pertinent data from previous investigations to identify the nature and extent (volumes) of potential extremely hazardous waste (EHW), federally designated hazardous waste,

and state dangerous waste (DW). While materials and soils in place cannot be described as wastes and therefore, are not subject to waste classification unless excavated (i.e., generated), such classification is appropriate to evaluate cleanup alternatives affected by land disposal restrictions and/or involving offsite disposal.

Washington Administrative Code (WAC) describes the book designation procedure for determining if a solid waste is an EHW or State DW. Based on these procedures, the book designation values for arsenic are 760,000 mg/Kg for EHW and 760 mg/Kg for State DW. The regulations also provide for bioassay testing to designate the waste classification. The bioassay approach supersedes the book designation and was performed as part of the investigation. As noted previously, no mortality was observed in any bioassay tests performed. The highest total arsenic concentration in samples tested was approximately 10,000 mg/Kg. Based on these results, materials containing greater than 760,000 mg/Kg arsenic would be classified as EHW, although it is noted that bioassay testing of materials with arsenic concentrations between 10,000 and 760,000 mg/Kg may result in a lower value. No level was established for State DW, however, it would be greater than 10,000 mg/Kg arsenic, based on the results of the bioassay testing.

No additional TCLP testing was performed during the recent smelter area investigation. Previous evaluations estimated that total arsenic concentrations of 3,000 mg/Kg would exceed the TCLP standard of 5 mg/L at the upper 95% confidence limit. This level would represent federally designated hazardous waste.

Based on this evaluation the aerial extent and depths of materials which, if excavated, would fall under the different waste categories was estimated. The findings were as follows:

- No EHW has been identified at the site.
- Materials which may be classified as State DW (greater than 10,000 mg/Kg arsenic) were contained within the fenced area, with the exception of a relatively small volume of material just outside the fence on the eastern boundary next to East

Marine View Drive. No potential State DW was identified in any current residential property. The materials were primarily associated with residual flue dust and arsenic in smelter debris within and immediately adjacent to the footprints of former smelter flues, dust chambers and arsenic processing units. The materials are present over an approximate area of 1.4 acres (this is the area for materials with 10,000 mg/Kg or greater arsenic: DW concentration will be higher than this as discussed above) at depths ranging from 1 to 10 feet. The aerial extent of this material is shown on Figure 8-1. The total volume of materials with arsenic concentrations greater than 10,000 mg/Kg is estimated to be approximately 10,000 to 15,000 cubic yards, with just 100 cubic yards present outside the fenced area in the East Marine View Drive right-of-way.

- The majority of materials which would be designated as federal hazardous waste if excavated were also contained in the fenced area with the exception of an area just outside the eastern fence along East Marine View Drive. The materials were associated with the same residuals discussed for State DW but with slightly greater areas of smelter debris and with soils underlying smelter materials in some areas. It is noted that occasional single values of arsenic concentrations have been measured above 3,000 mg/Kg at other areas at the site (Medora Way, for example). However, these appear to represent small pockets of materials which could not be excavated discretely and would therefore most likely not be classified as hazardous waste after excavation with the immediately adjacent material. Based on this analysis, the materials in the fenced area which are predicted to fail TCLP are present over an approximate area of 2.8 acres at depths ranging from 1 to 10 feet. The estimated aerial extent of these materials is shown on Figure 8-1. The total volume of materials with arsenic concentrations greater than 3,000 mg/Kg is estimated to be approximately 20,000 to 25,000 cubic yards, with just 600 cubic yards present outside the fenced area in the adjacent East Marine View Drive right-of-way.

As noted above, identification of the nature and extent of smelter residuals containing arsenic trioxide or flue dust was the overarching goal of the smelter area investigation. These residuals are the focus of the evaluation of potential waste categories as well as the evaluation of sources of arsenic to storm water and groundwater. The principal findings of the smelter area investigation with respect to smelter material residuals are:

- Test pits identified intact floors and foundations of former smelter structures at between one to four feet below current ground surface at several locations. In addition an intact underground flue was identified in the northern portion of the

fenced area. These observations corroborated within a few feet the location of the former smelter structures which was estimated based on historical smelter maps. Debris from smelter demolition is present above the intact floors within the footprints of former smelter structures and in immediately adjacent areas.

- The investigation confirmed that the smelter materials of primary interest are residual arsenic trioxide and flue dust. Arsenic trioxide was a product of the smelting process, containing approximately, but less than 760,000 mg/Kg arsenic. Flue dust was a byproduct of smelting and roasting operations, containing approximately 25,000 mg/Kg arsenic.
- Residual arsenic trioxide and flue dust is present, usually mixed with demolition debris, within and adjacent to the footprints of structures where it was handled, processed or stored during smelter operation. The highest arsenic concentrations measured were in smelter material containing residual arsenic trioxide. Transport of arsenic from residual smelter materials to underlying soils has occurred at some locations indicating that these materials have potential to be sources of arsenic to groundwater. In most cases the arsenic concentrations attenuated rapidly with depth.
- Soil borings drilled around the southern boundary of the fenced area did not find smelter residuals outside the fence between Hawthorne Street and East Marine View Drive.
- Soil borings drilled inside and outside the fence along the western boundary of the fenced area indicate that smelter residuals are not present outside the fence along Hawthorne Street.
- Soil borings drilled during the smelter area investigation in around Medora Way and Whitehorse Trail (in the northern portion of the former smelter area, east of State Route 529) did not find smelter residuals. Based on the findings of this and previous investigations, it appears that the presence of smelter residuals may be limited to a relatively small area at 211 Medora Way. It is possible that material containing smelter residuals was used as fill before or during construction on this property.
- Sixteen shallow soil borings drilled in the fill beneath the State Route Overpass, immediately east of the main former smelter area indicate that the fill contains small amounts of smelter material. The findings are consistent with use of soils excavated from the cloverleaf for fill in this area. Arsenic concentrations in these soils were significantly lower than in smelter materials present in the fenced area.

Synthetic Precipitation Leachate Procedure (SPLP) testing demonstrated that smelter materials containing residual arsenic trioxide or flue dust can act as sources of arsenic under ambient leaching conditions. These smelter materials are identified as the principal potential sources of arsenic to groundwater in the former smelter area, although other localized factors are likely to be important such as material volume and infiltration rates. The estimated aerial extent of smelter residuals containing arsenic trioxide or flue dust is shown on Figure 8-1.

Limited testing of surface soils was performed to evaluate potential sources of arsenic to surface water: samples were collected at five locations in the cloverleaf area. The results indicated that no additional sources were identified over those evaluated as part of the recent storm water/sediment evaluation which is being performed as a separate task under the Enforcement Order. Sources of arsenic to surface water appear to be associated with smelter residual materials in the fenced area. The findings on the nature and extent of materials which may be acting as sources of arsenic to storm water are presented in the Storm Water and Storm Drain Sediment Characterization Controls Work Plan (Asarco, 1998b).

In summary, the smelter area investigation filled data gaps from previous investigations to further refine the nature and extent (volume) of smelter residuals within and adjacent to the former smelter footprint... The data were used to evaluate the nature and extent of materials, which if excavated, may be classified as extremely hazardous waste, federally designated hazardous waste and state dangerous waste. The smelter residuals are also the principal potential sources of arsenic to groundwater and surface water. The estimated extent of these potential waste and source materials is shown on Figure 8-1. In addition, summary maps showing sample locations from all pertinent investigations, the maximum concentration of arsenic or lead and its depth of occurrence, an indication of the presence or absence of smelter residuals and the estimated extent of potential material categories are shown as Figures 8-2 and 8-3.

## 8.2 FUTURE INVESTIGATIONS

The smelter area investigation provided data required to meet the objectives of the Enforcement Order. The investigation was also designed to fill data gaps from previous studies, including the pre-RI and RI, and thereby provide a more comprehensive understanding of former smelter area conditions pertinent to the identification and evaluation of cleanup alternatives. The investigation was intended to provide sufficient information to allow for development of cleanup action plan, recognizing that additional sampling will be required to support design of the cleanup action.

The smelter area investigation is a component of on-going site-wide investigations being performed as separate studies. These studies include the Stormwater and Storm Drain Sediment Characterization and Controls Program and continuation of the supplemental lowland investigation.

The Stormwater and Storm Drain Sediment Characterization and Controls Program was initiated in May 1998. The various field investigation tasks for this program will develop additional data regarding drainage pathways, discharge points, and the quality and quantity of storm water runoff in and around the former smelter area. The compiled information will be used to develop a water balance and to estimate arsenic and metals loads for discrete areas. The scope and schedule of this program is described in a separate work plan (Asarco, 1998b).

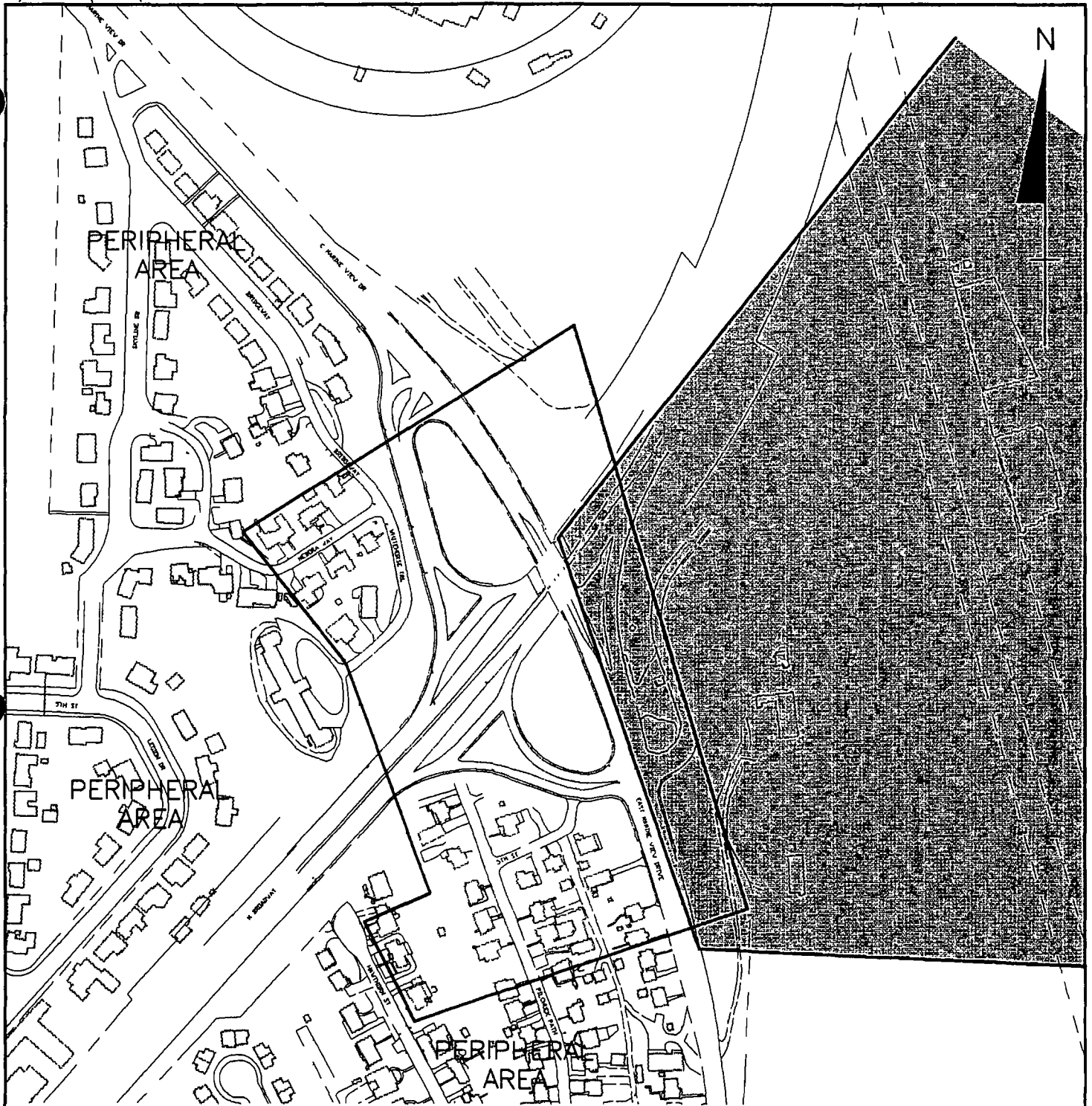
Field work as part of the planned continuation of the supplemental lowland investigation, is scheduled to be performed in August and September 1998. The proposed field work will provide data to further characterize the nature and extent of arsenic and metals in shallow and deep groundwater and soils. The scope and schedule of this program is described in a separate work plan (Asarco, 1998c).

The data and findings from the storm water and storm drain sediment and controls program, the smelter area investigation described in this report, and the upcoming lowlands investigation will be integrated with data collected by all previous investigations in the former smelter area and lowlands and presented in the final supplemental lowland investigation report. This report, which is scheduled to be completed in the spring of 1999 will provide a comprehensive characterization of the smelter and lowland areas. The report will document evaluations of groundwater flow directions and gradients, delineation of arsenic and metals concentrations in soil and groundwater, identification of potential sources of arsenic, and assessment of fate and transport of arsenic and other metals from potential source areas in the upland and lowland areas through groundwater and surface water flow systems, including contaminant flux estimates. This comprehensive evaluation will support identification and evaluation of integrated cleanup action alternatives for the smelter and lowland areas.

## **9.0 REFERENCES**

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- Asarco, 1997a. Smelter Area Investigation Sampling and Analysis Plan. Everett Smelter Site. Everett, Washington.
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- Asarco, 1998c. Supplemental Remedial Investigation Work Plan for the Lowland Area Everett Smelter Site. Everett, Washington.
- Braden, 1899. Report on the Everett Smelter.
- Collins, 1899. Metallurgy of Lead and Silver. Part I - Lead. Griffin & Company.
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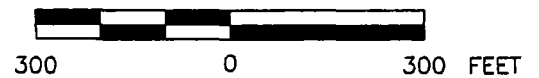
## **FIGURES**



**LEGEND:**

- SMELTER AREA
- LOWLAND STUDY AREA

SCALE



**ASARCO**  
EVERETT SMELTER SITE  
FIGURE 2-1

**SMELTER AREA  
LOCATION MAP**

PROJECT: 5377.1	DATE: OCTOBER 1998
REV:	BY: DHT CHECKED: AK

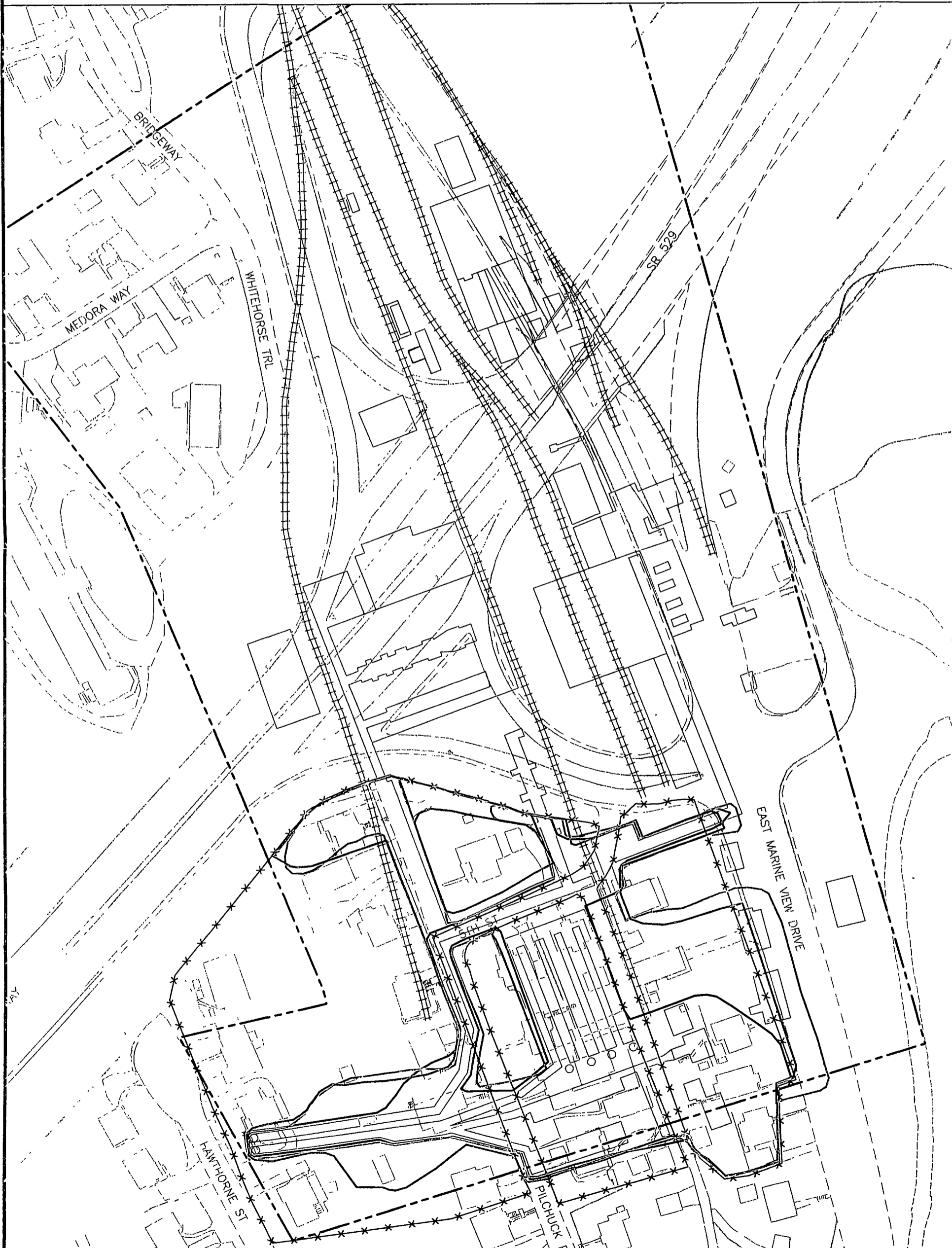
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## LEGEND



SCALE  
(In Feet) 0 100

- ESTIMATED EXTENT OF MATERIAL WITH ARSENIC CONCENTRATIONS GREATER THAN 3000 MG/KG (POTENTIAL FEDERALLY DESIGNATED HAZARDOUS WASTE, IF GENERATED)
- ESTIMATED EXTENT OF MATERIAL WITH ARSENIC CONCENTRATIONS GREATER THAN 10000 MG/KG (POTENTIAL STATE DESIGNATED DANGEROUS WASTE, IF GENERATED)
- ESTIMATED EXTENT OF SMELTER RESIDUAL CONTAINING ARSENIC TRIOXIDE OR FLUE DUST

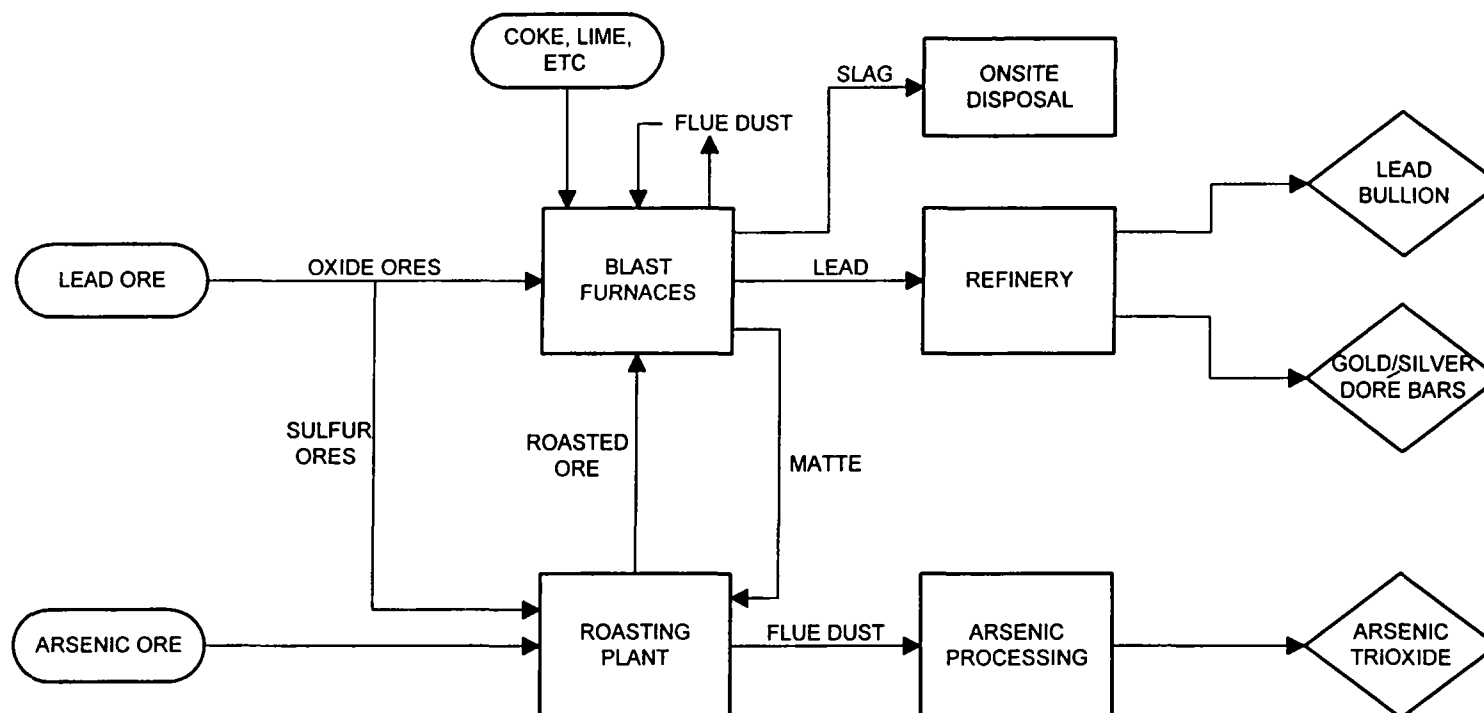
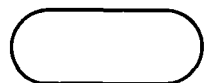


ASARCO INCORPORATED  
SMELTER AREA INVESTIGATION  
EVERETT SMELTER SITE  
EVERETT, WASHINGTON

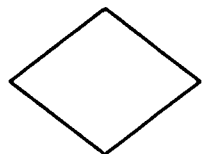
ESTIMATED EXTENT OF POTENTIAL  
MATERIAL CATEGORIES

FIGURE

1-1

**LEGEND:**

RAW MATERIAL



PRODUCTS

**ASARCO**  
EVERETT SMELTER SITE

FIGURE 4-1  
**GENERALIZED PROCESS  
SCHEMATIC**

PROJECT 5377 1	DATE OCTOBER, 1998
REV	BY DHT CHECKED AK

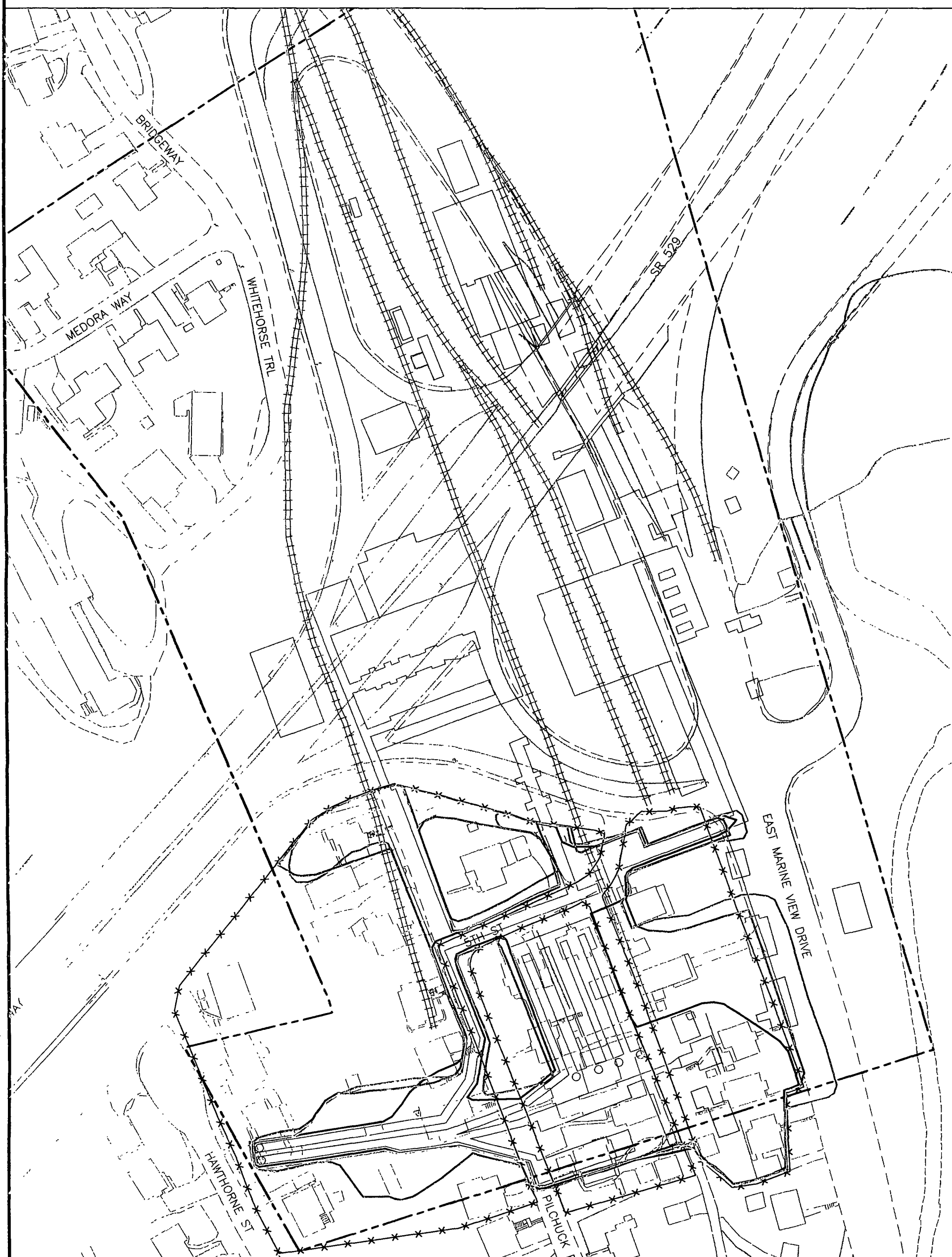
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**LEGEND**

- ESTIMATED EXTENT OF MATERIAL WITH ARSENIC CONCENTRATIONS GREATER THAN 3000 MG/KG (POTENTIAL FEDERALLY DESIGNATED HAZARDOUS WASTE, IF GENERATED)
- ESTIMATED EXTENT OF MATERIAL WITH ARSENIC CONCENTRATIONS GREATER THAN 10000 MG/KG (POTENTIAL STATE DESIGNATED DANGEROUS WASTE, IF GENERATED)
- ESTIMATED EXTENT OF SMELTER RESIDUAL CONTAINING ARSENIC TRIOXIDE OR FLUE DUST



**SCALE**  
(In Feet) 0 100



ASARCO INCORPORATED  
SMELTER AREA INVESTIGATION  
EVERETT SMELTER SITE  
EVERETT, WASHINGTON

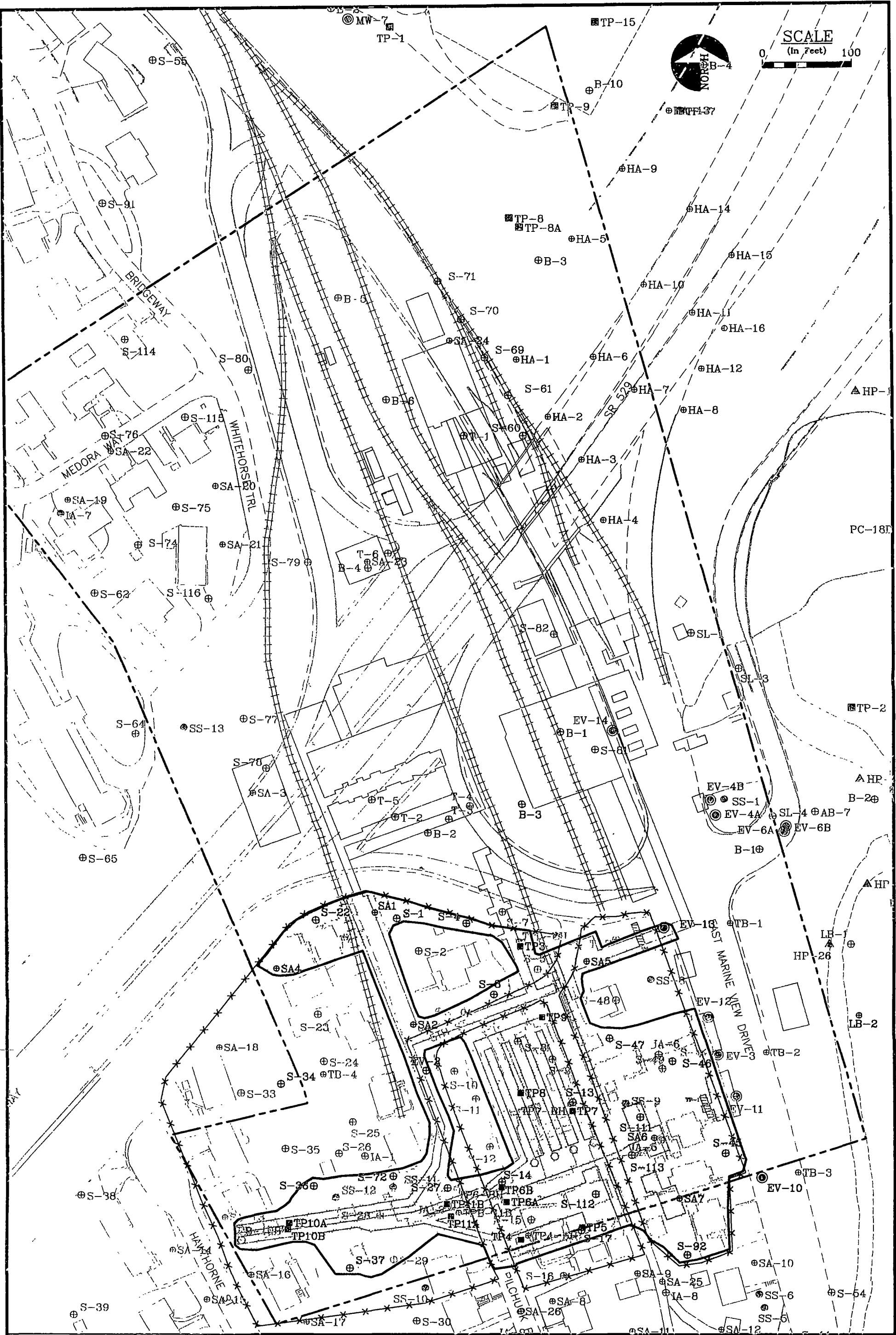
**ESTIMATED EXTENT OF POTENTIAL  
MATERIAL CATEGORIES**

**FIGURE  
8-1**

UPDATE TIME 3 40PM  
008 \ 0668 \ 065 \ 0083 \ TAC \ 100198 \ \ STORAGE \ 6888706 DMC

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Consulting Scientists, Engineers and Contractors

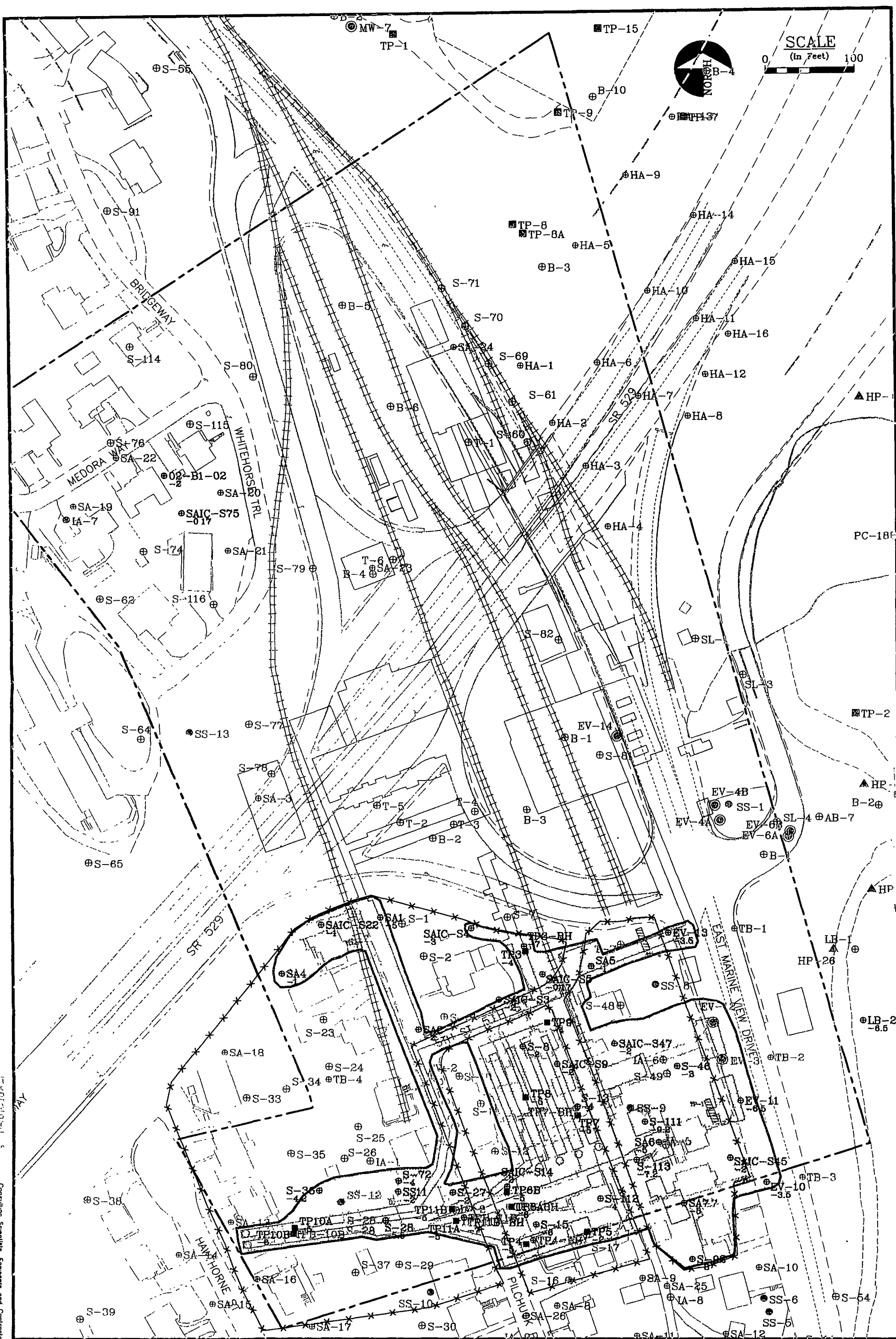
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ASARCO INCORPORATED  
SMELTER AREA INVESTIGATION  
EVERETT SMELTER SITE  
EVERETT, WASHINGTON

ESTIMATED EXTENT OF SMELTER  
RESIDUAL CONTAINING ARSENIC  
TRIOXIDE OR FLUE DUST

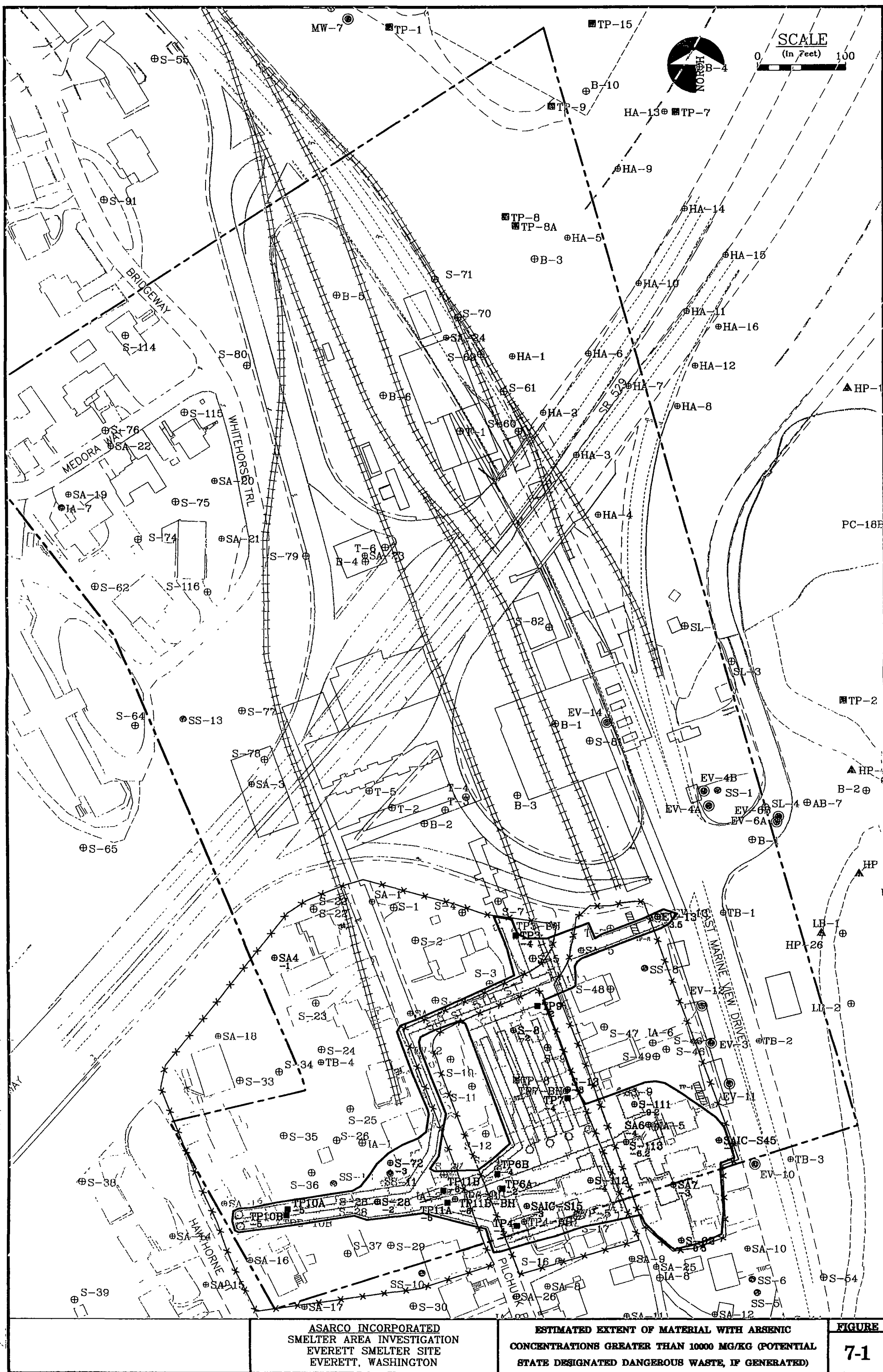
FIGURE  
7-3

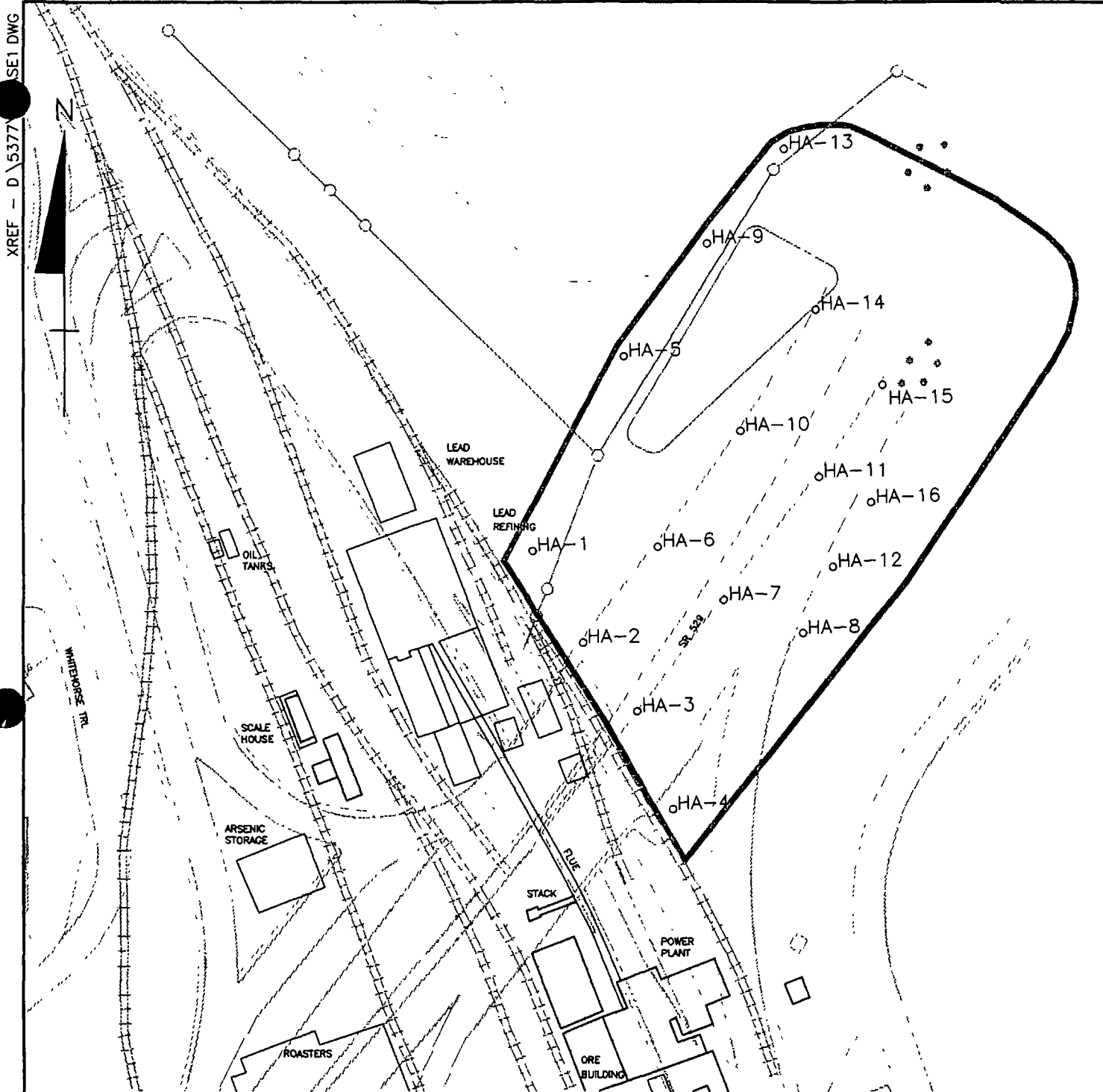


**ESTIMATED EXTENT OF MATERIAL WITH ARSENIC  
CONCENTRATIONS GREATER THAN 3000 MG/KG (POTENTIAL  
FEDERALLY DESIGNATED HAZARDOUS WASTE, IF GENERATED)**

## FIGURE

**7-2**



**LEGEND**REMOVED FORMER SMELTER  
STRUCTURES

FORMER RAILROAD TRACKS, REMOVED



STATE ROUTE 529 OVERPASS AREA



CURRENT SITE FEATURES

**EXISTING ELEMENTS**

○ HA-6

SOIL BORING LOCATION

SCALE



100 0 100 FEET

ASARCO  
EVERETT SMELTER SITE

FIGURE 5-6

STATE ROUTE 529 OVERPASS  
AREA - SAMPLING LOCATIONS

PROJECT: 5377.1

DATE: OCTOBER 1998

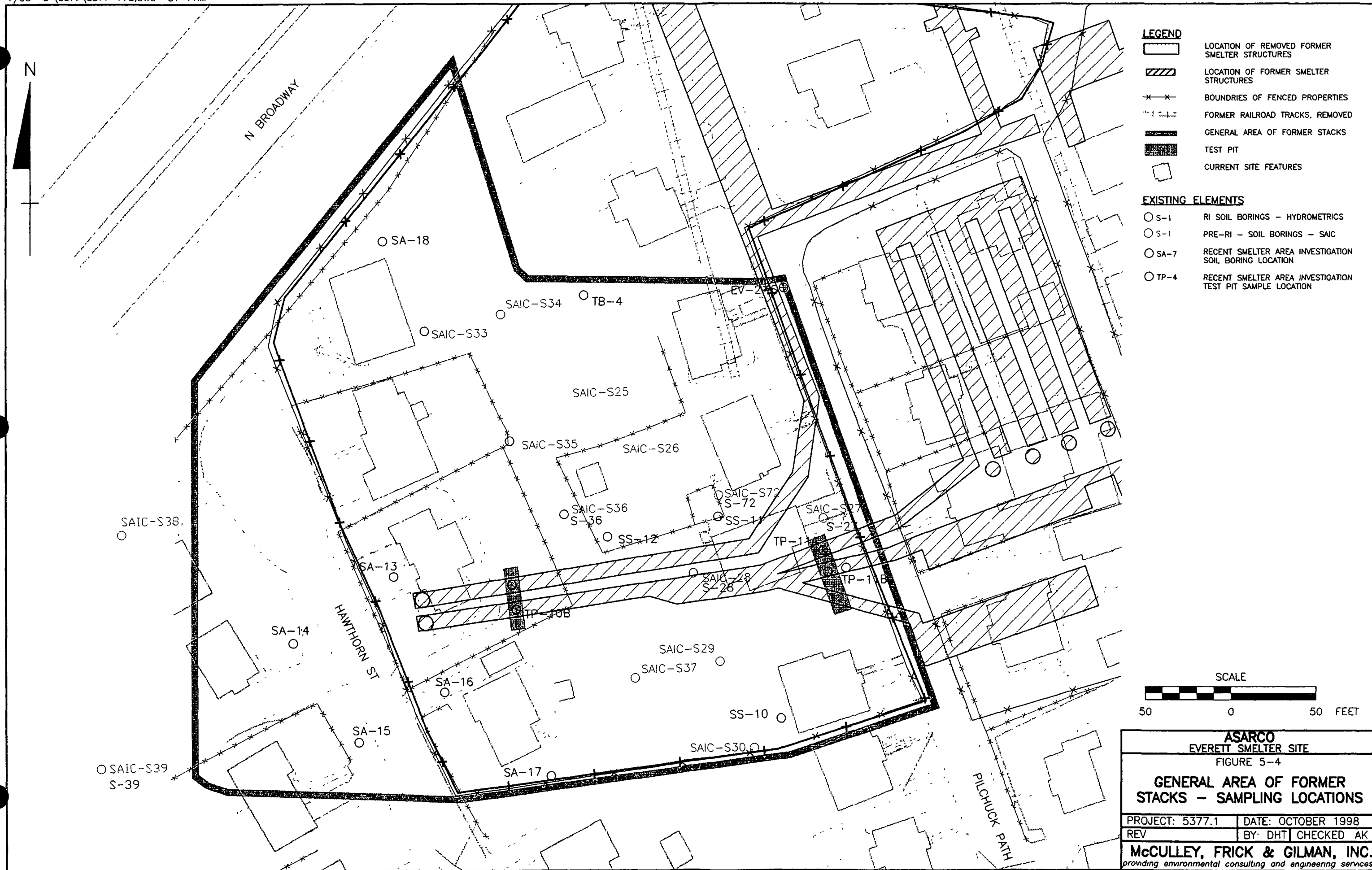
REV

BY: DHT CHECKED AK

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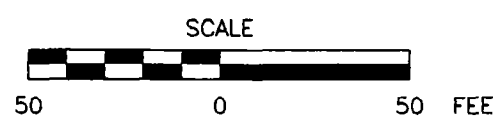


XREF - D\5377\5377-76 DWG

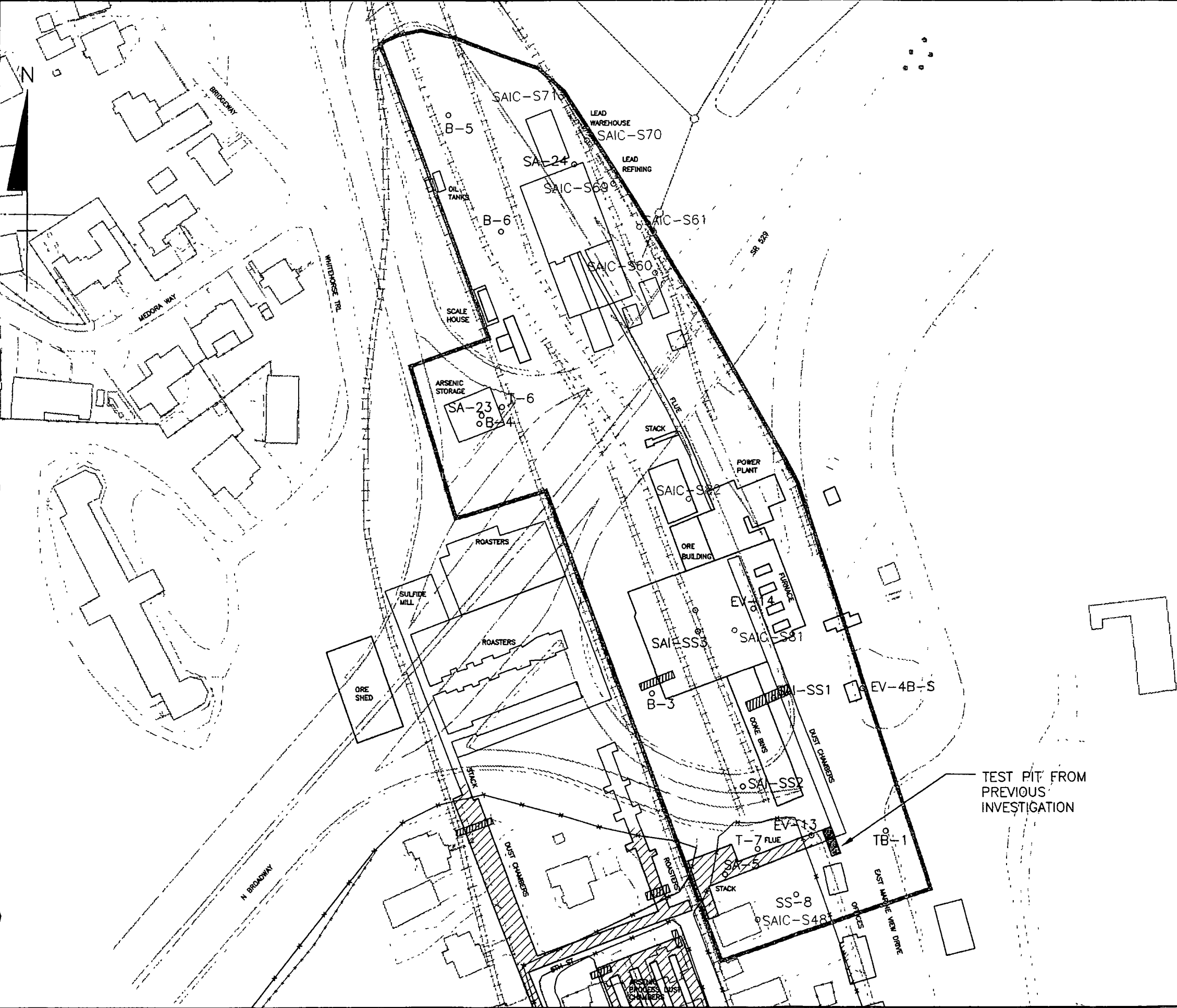


- LEGEND**
- LOCATION OF REMOVED FORMER SMELTER STRUCTURES
  - LOCATION OF FORMER SMELTER STRUCTURES
  - BOUNDARIES OF FENCED PROPERTIES
  - FORMER RAILROAD TRACKS, REMOVED
  - FORMER ARSENIC PROCESSING AREA
  - CURRENT SITE FEATURES

- EXISTING ELEMENTS**
- RI SOIL BORINGS - HYDROMETRICS
  - S-1 PRE-RI - SOIL BORINGS - SAIC
  - SA-7 RECENT SMELTER AREA INVESTIGATION SOIL BORING LOCATION
  - RECENT SMELTER AREA INVESTIGATION TEST PIT SAMPLE LOCATION
  - TB-1 RECENT SMELTER AREA INVESTIGATION SOIL BORING TO DELINEATE BOUNDARY OF TILL



<b>ASARCO</b>	
EVERETT SMELTER SITE	
FIGURE 5-3	
<b>FORMER ARSENIC PROCESSING AREA - SAMPLING LOCATIONS</b>	
PROJECT: 5377.1	DATE: OCTOBER 1998
REV:	BY: DHT CHECKED: AK
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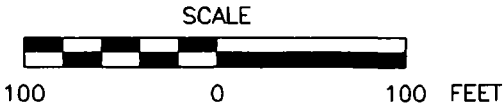


LEGEND

- LOCATION OF REMOVED FORMER SMELTER STRUCTURES
- LOCATION OF FORMER SMELTER STRUCTURES
- BOUNDARIES OF FENCED PROPERTIES
- FORMER RAILROAD TRACKS, REMOVED
- FORMER BLAST FURNACE/LEAD REFINING OPERATIONS AREA
- CURRENT SITE FEATURES

EXISTING ELEMENTS

- S-1 RI SOIL BORINGS - HYDROMETRICS
- S-1 PRE-RI - SOIL BORINGS - SAIC
- SA-7 RECENT SMELTER AREA INVESTIGATION SOIL BORING LOCATION
- TP-4 RECENT SMELTER AREA INVESTIGATION TEST PIT SAMPLE LOCATION
- TP-4 RECENT SMELTER AREA INVESTIGATION SOIL BORING TO DELINEATE BOUNDARY OF TILL



ASARCO  
EVERETT SMELTER SITE

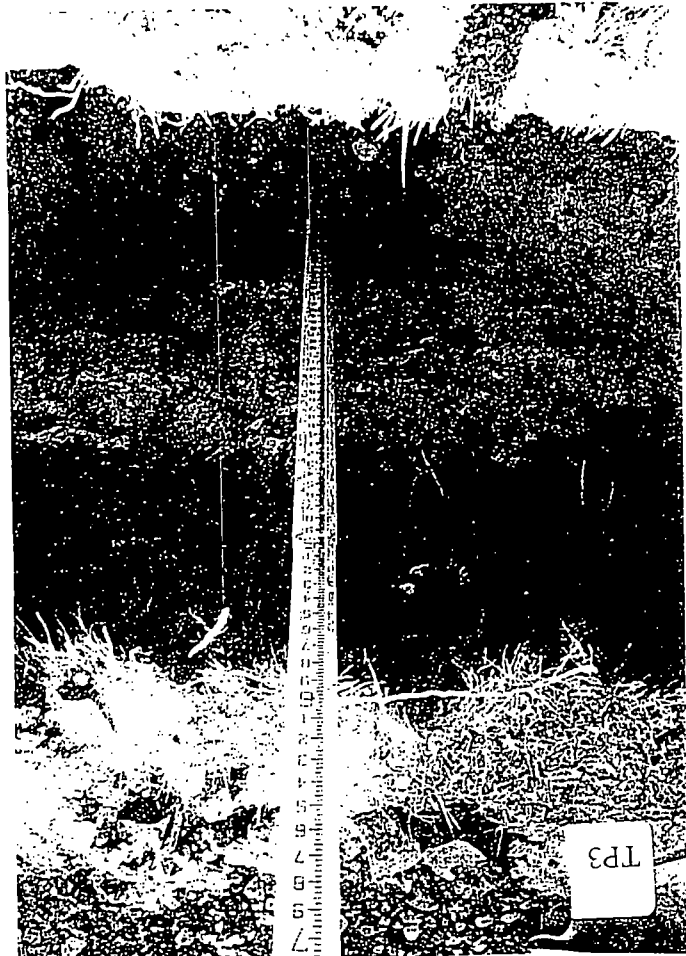
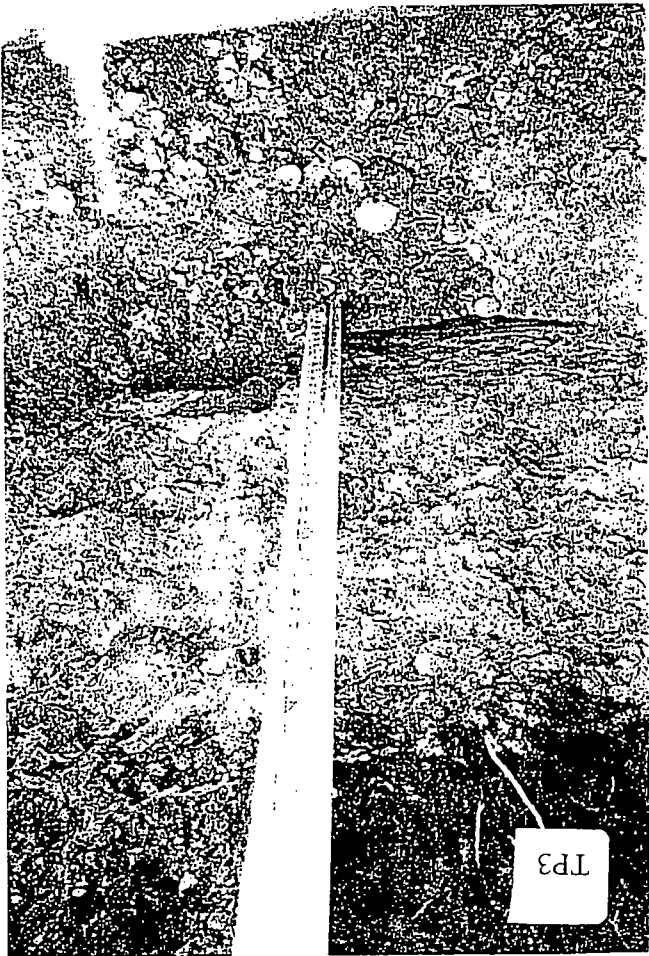
FIGURE 5-2  
FORMER BLAST FURNACE/LEAD REFINING  
OPERATIONS AREA - SOIL SAMPLING  
LOCATIONS

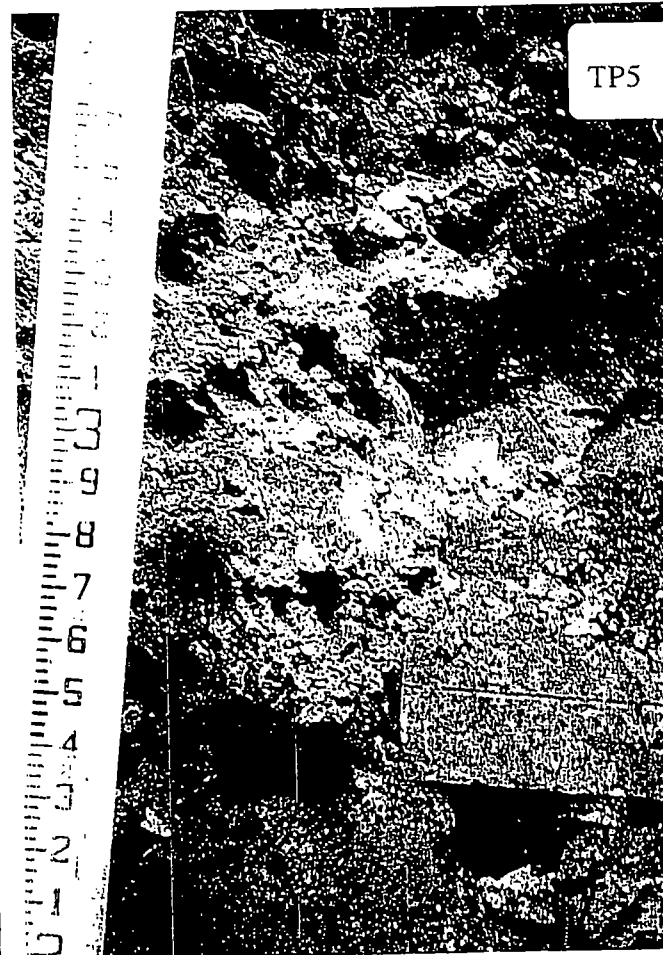
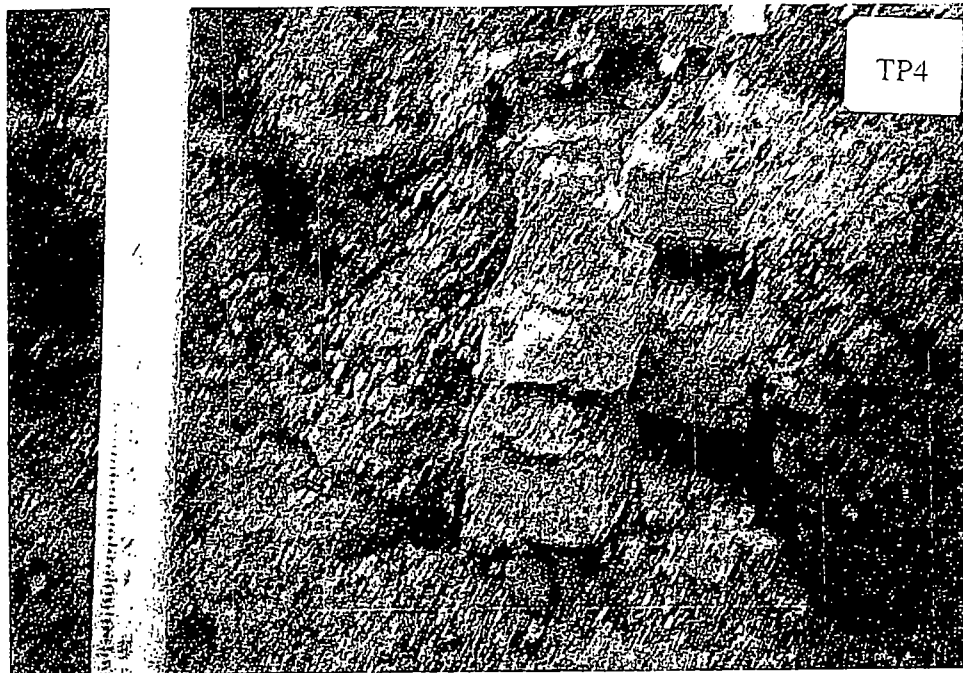
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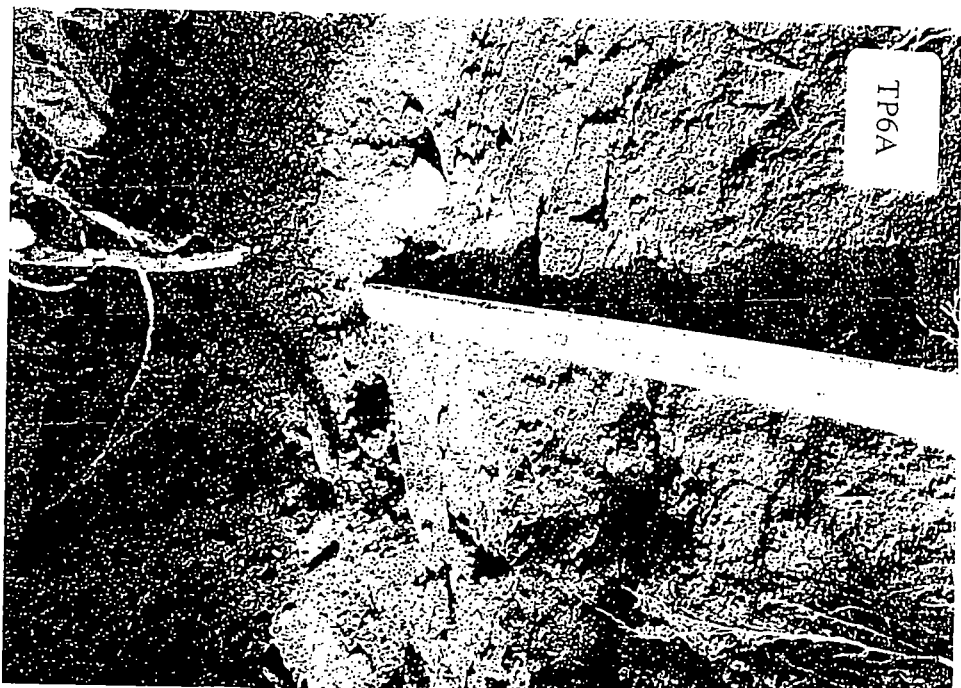
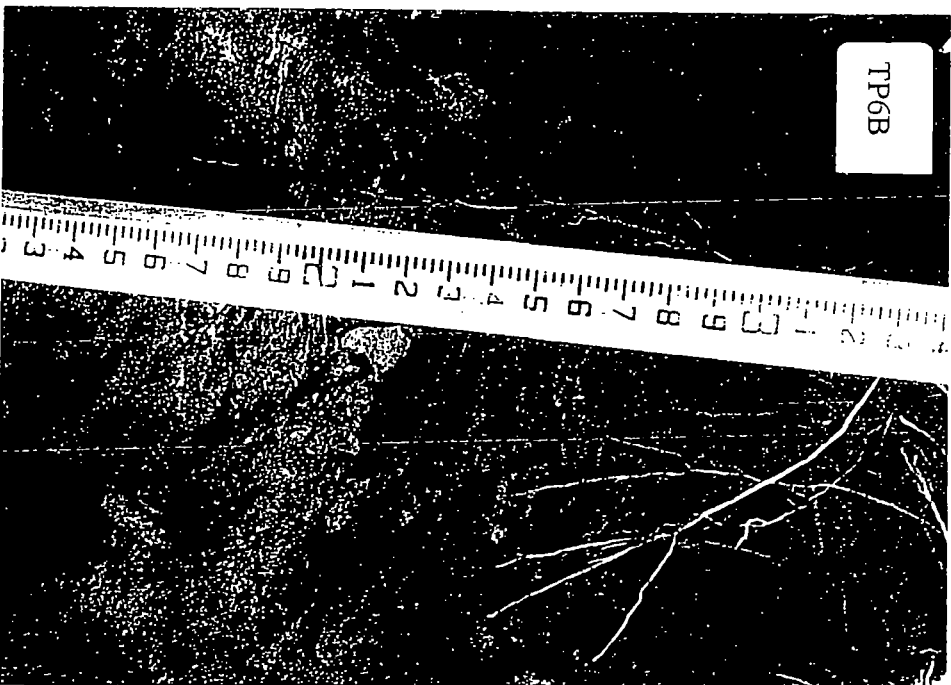
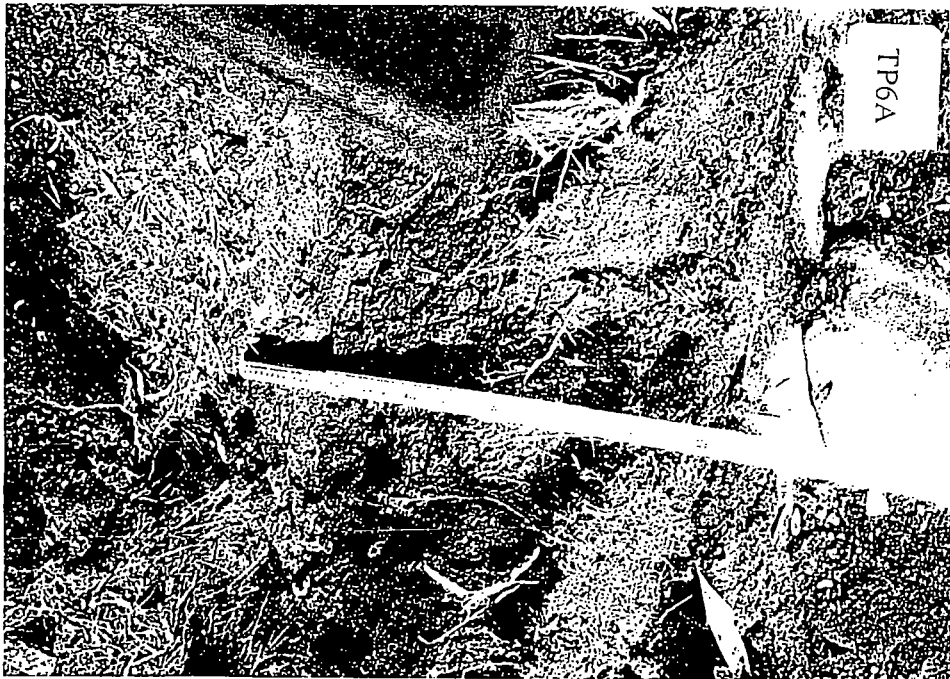
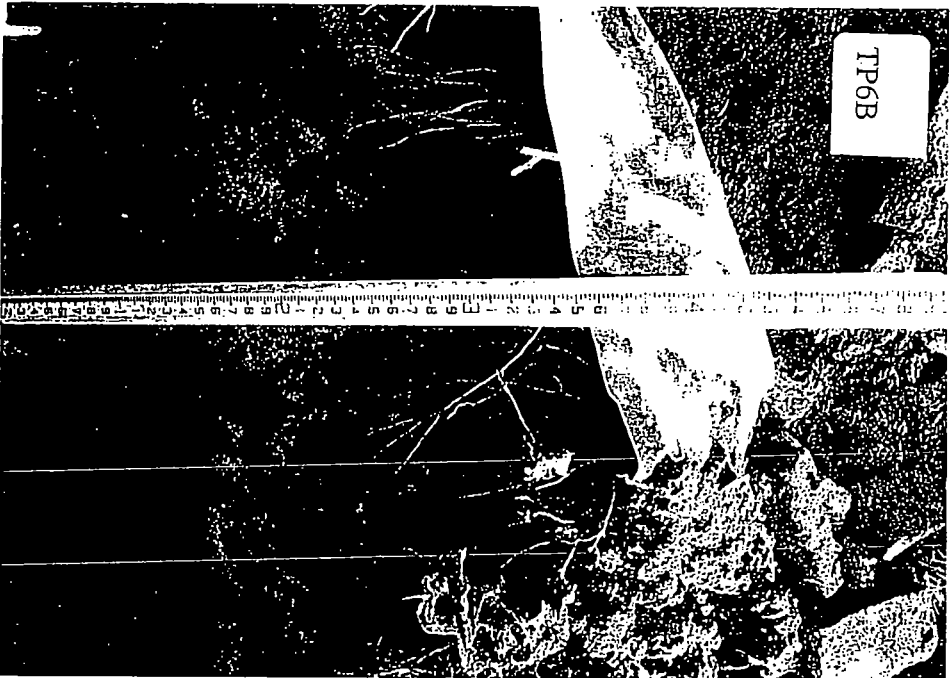
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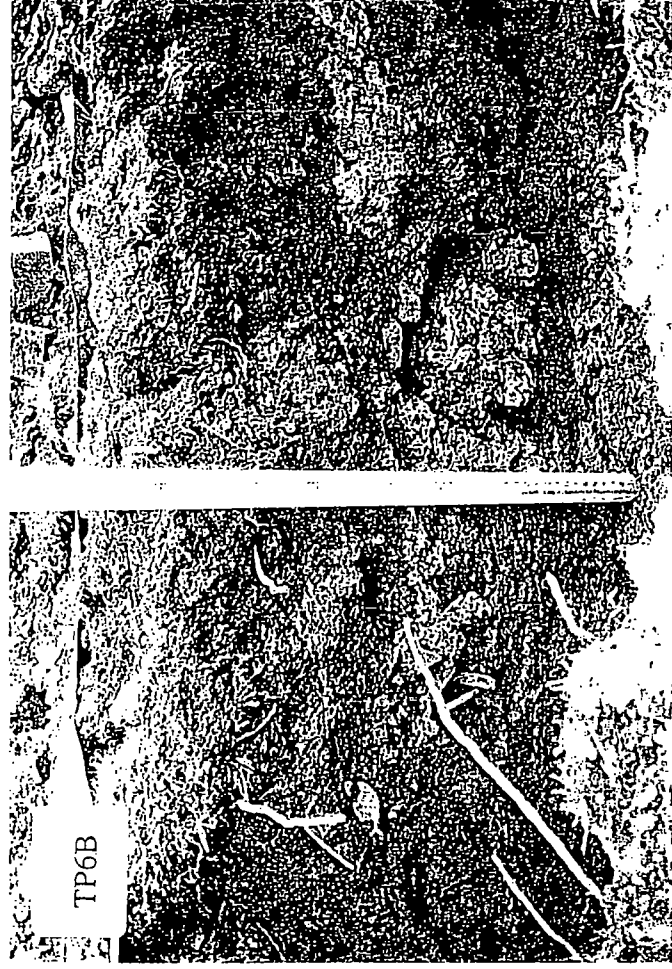
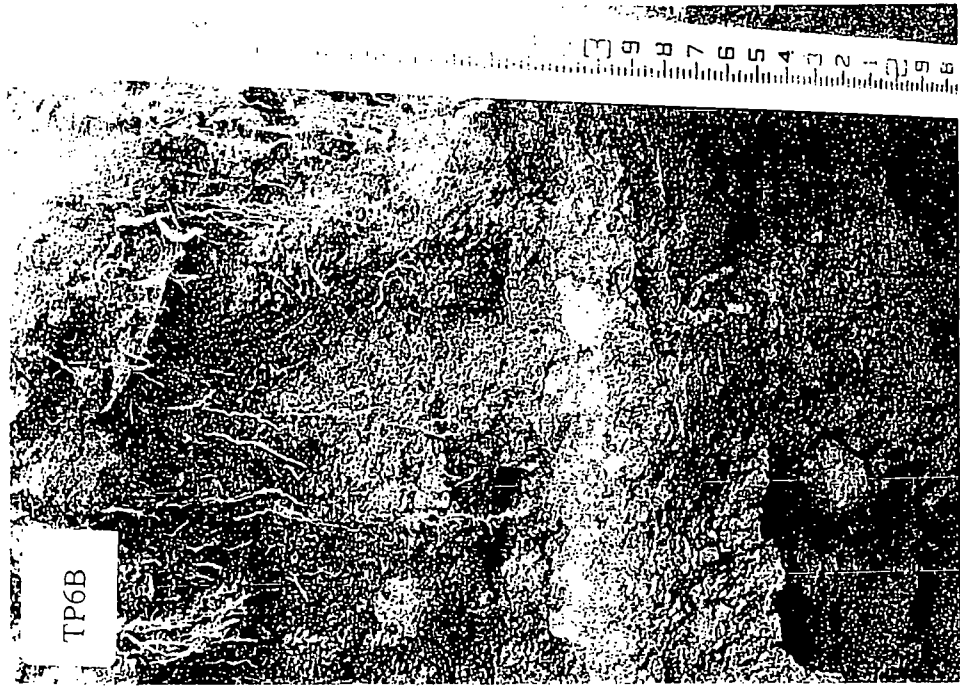


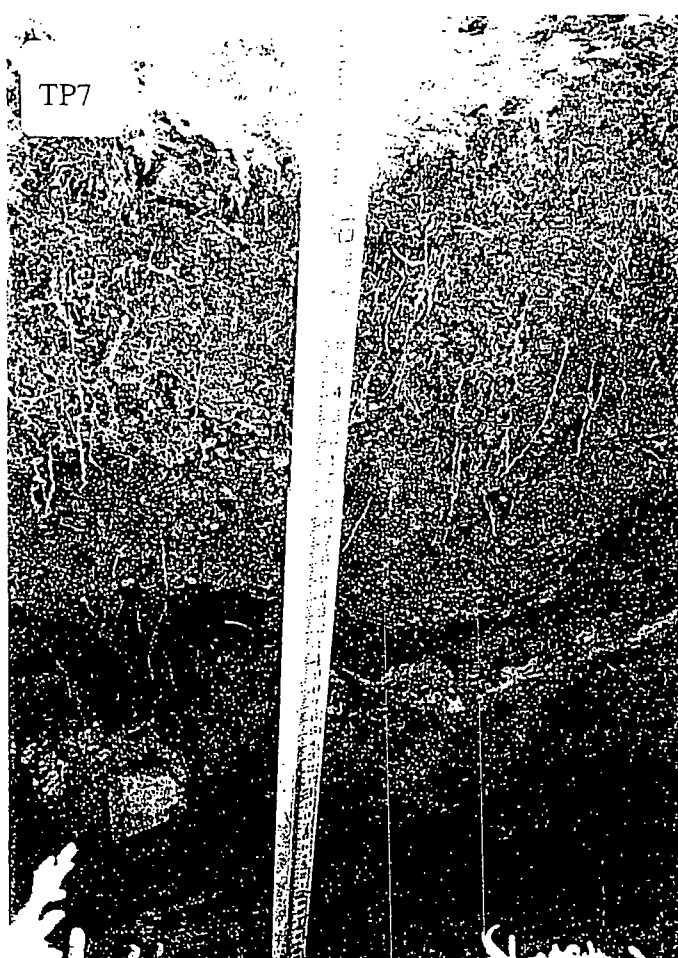
**APPENDIX A**  
**Test Pit Photographs**



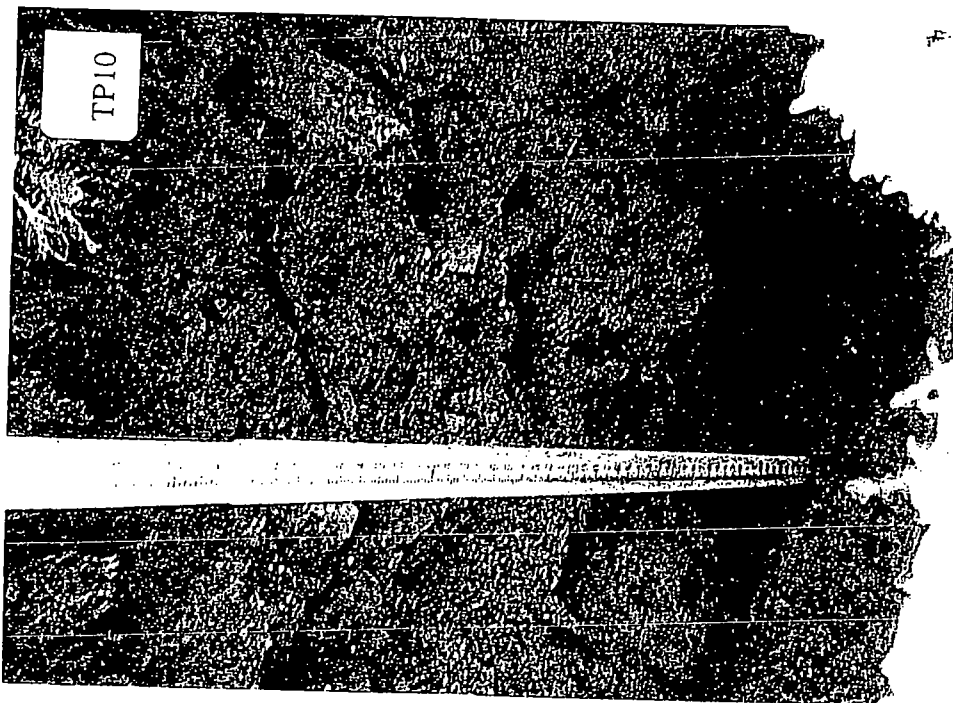
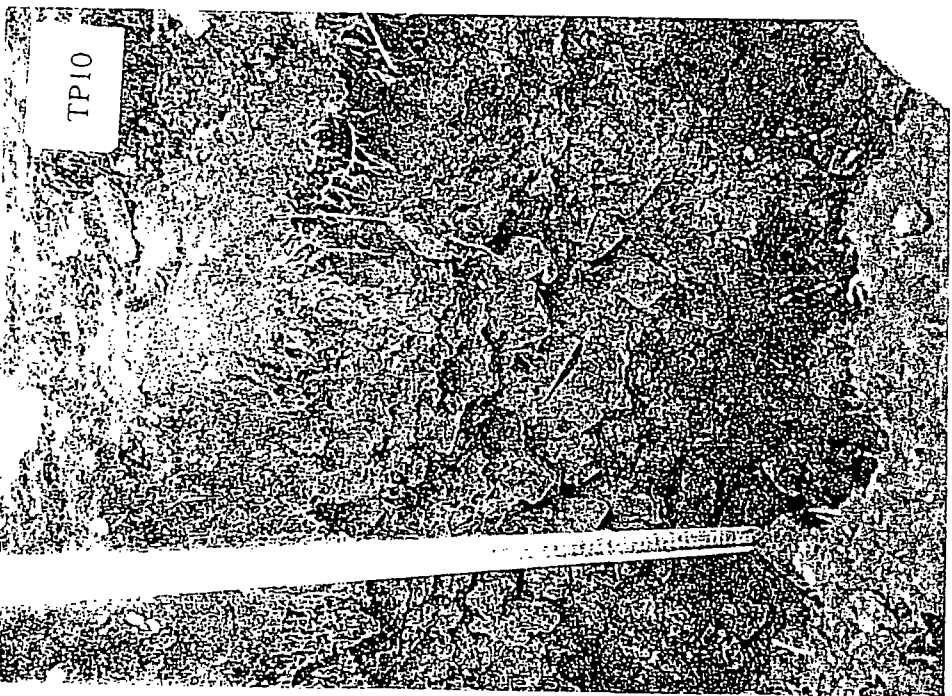
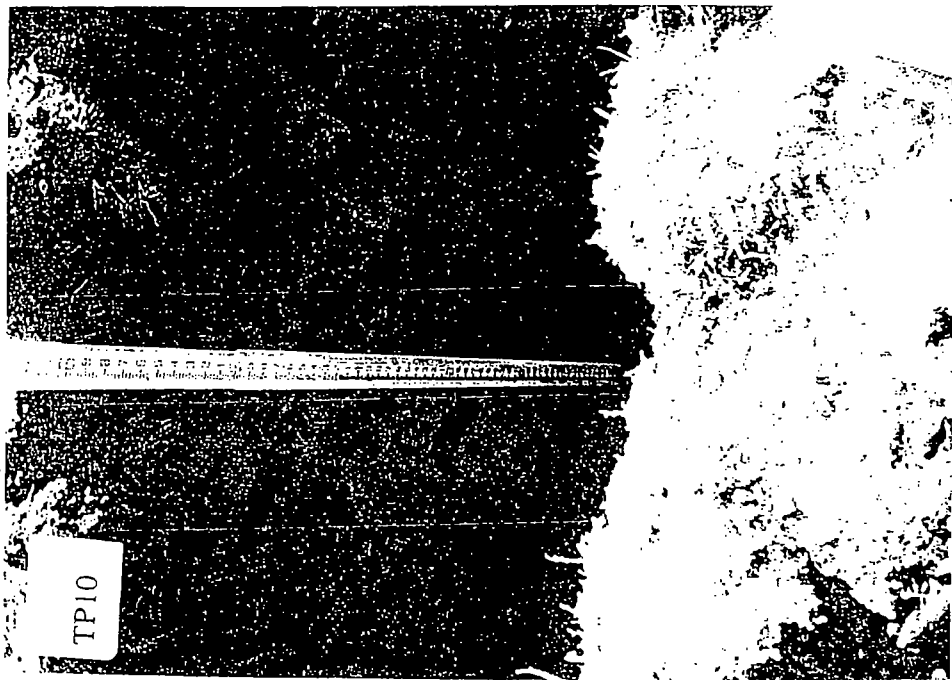


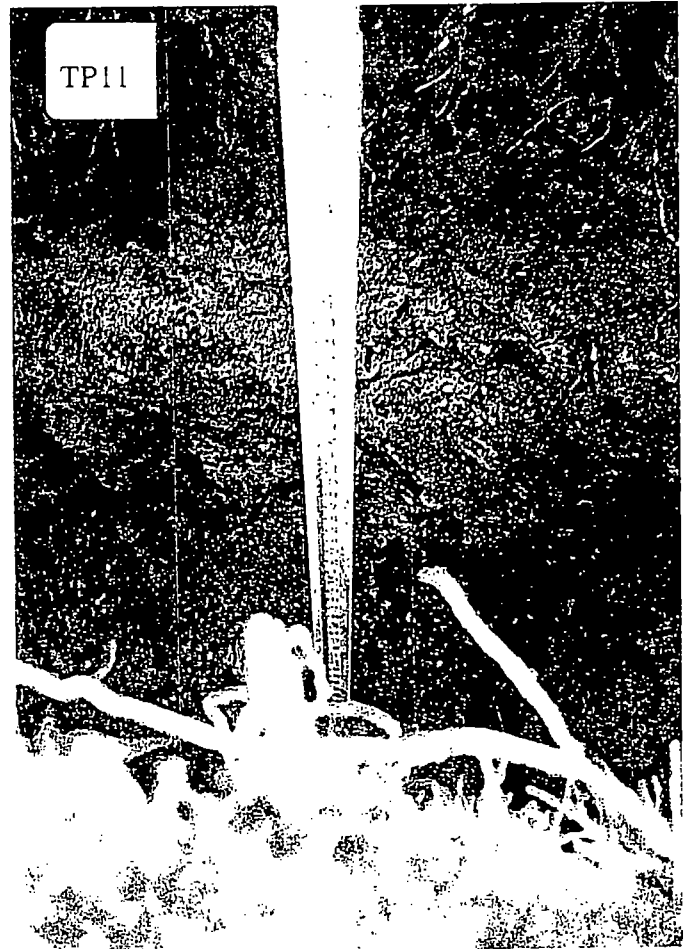
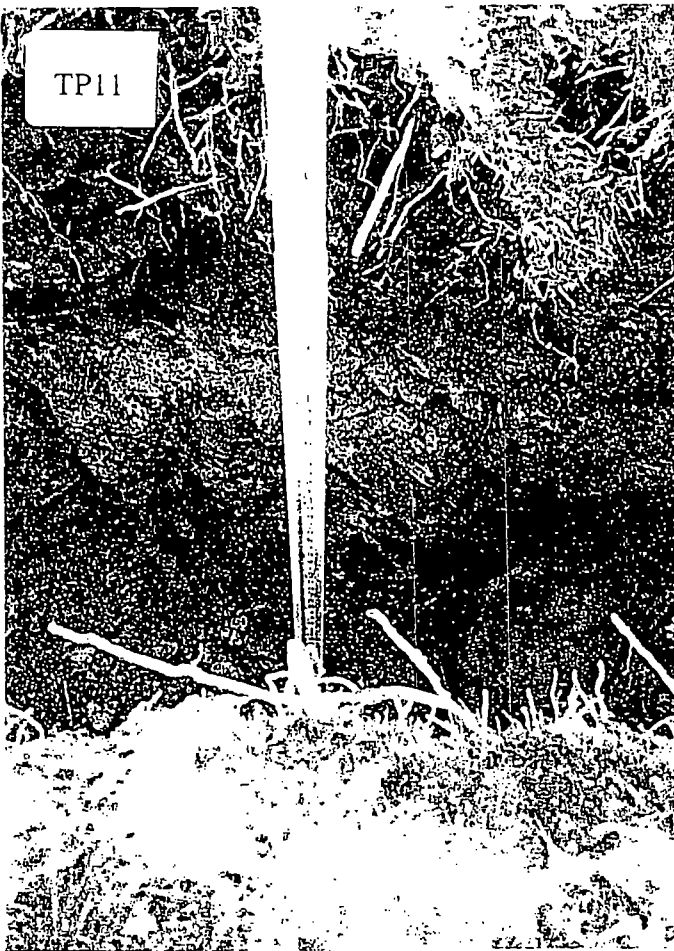
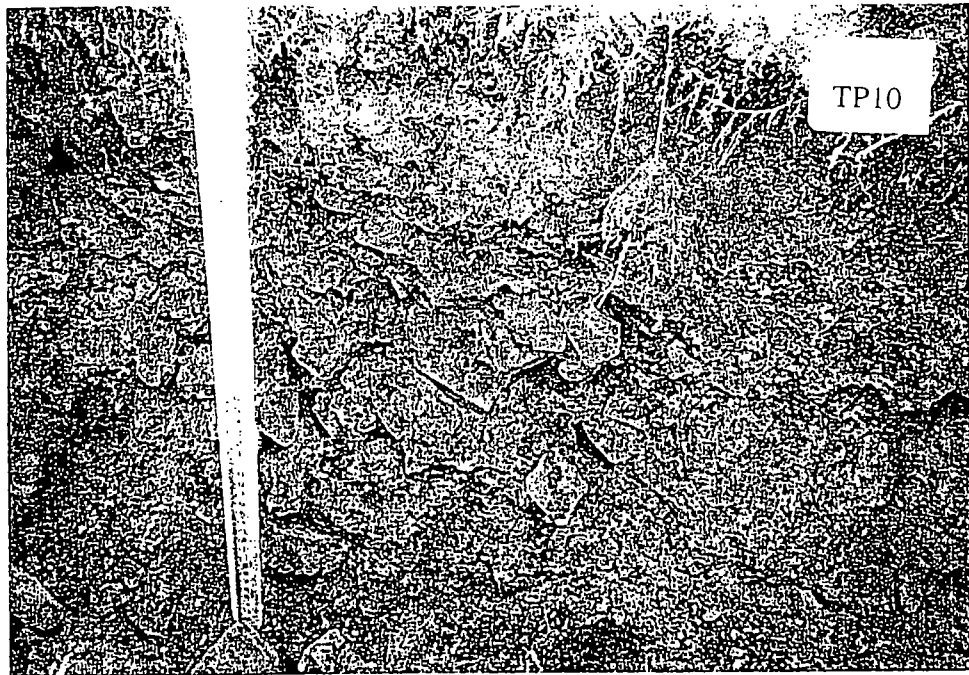


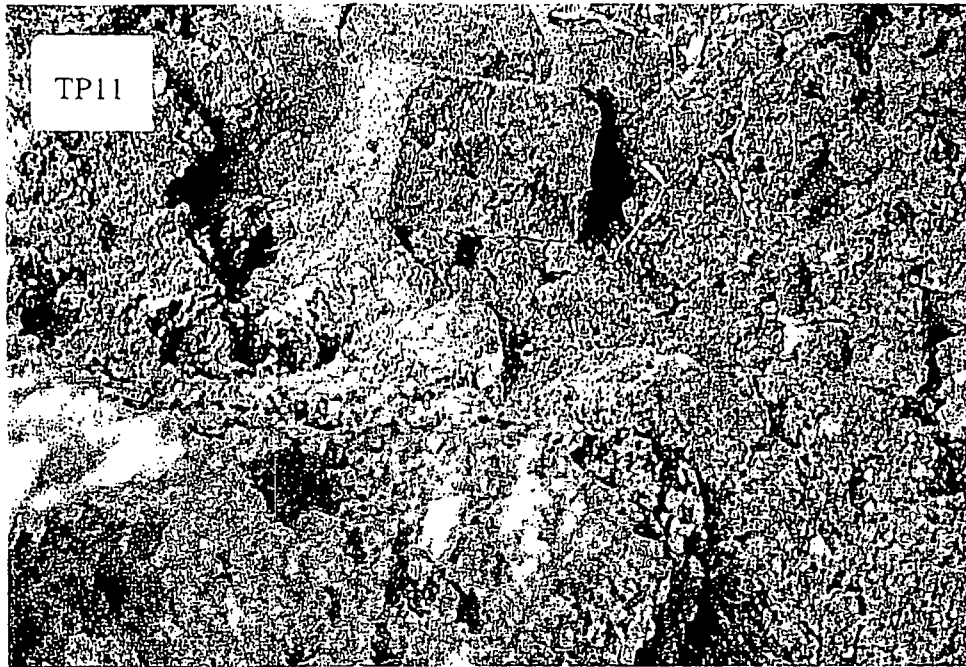
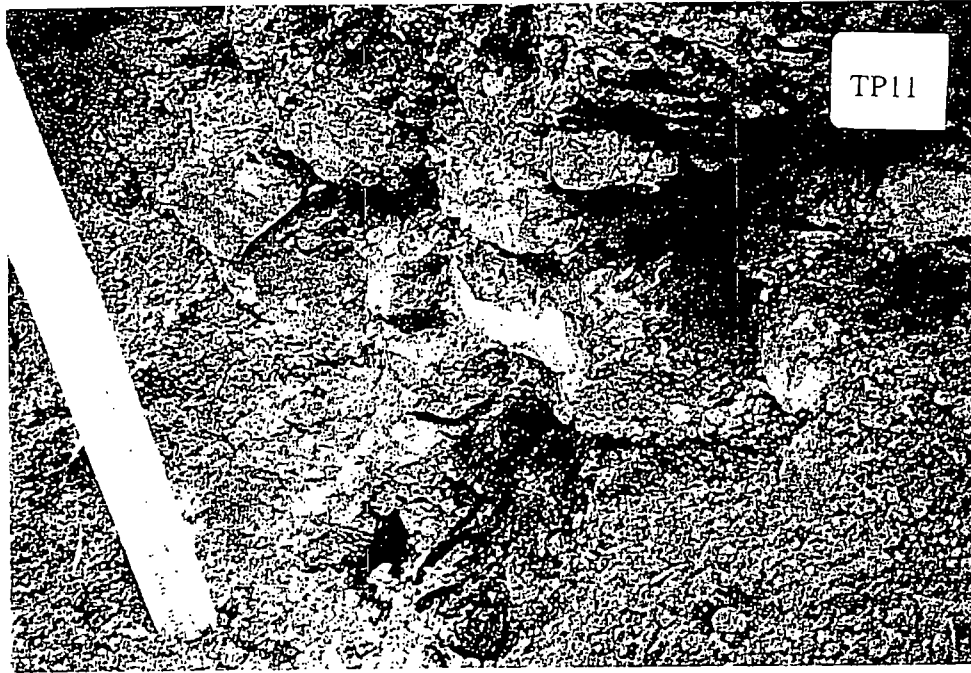


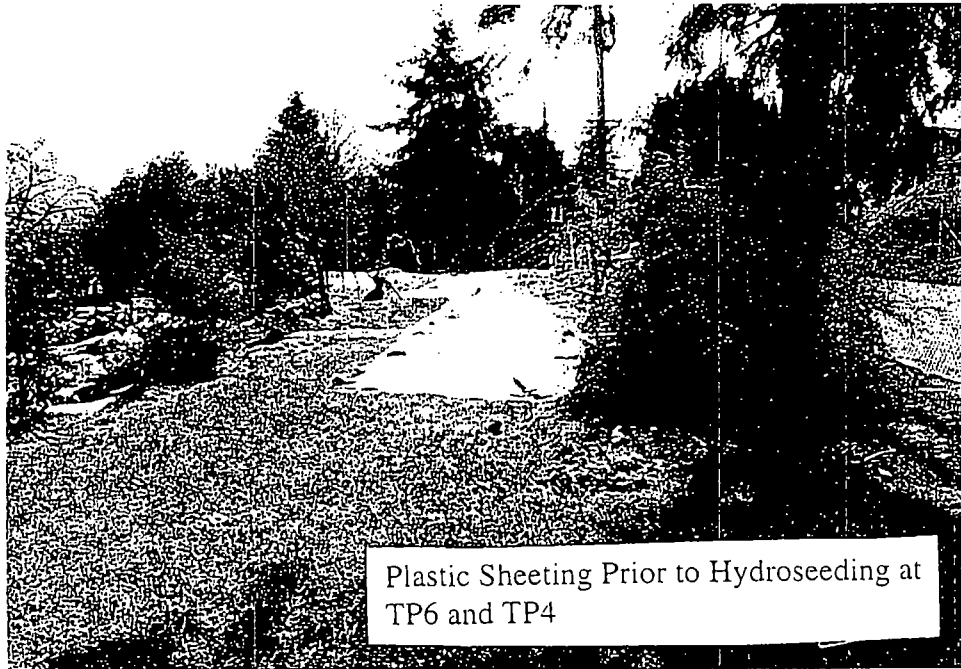




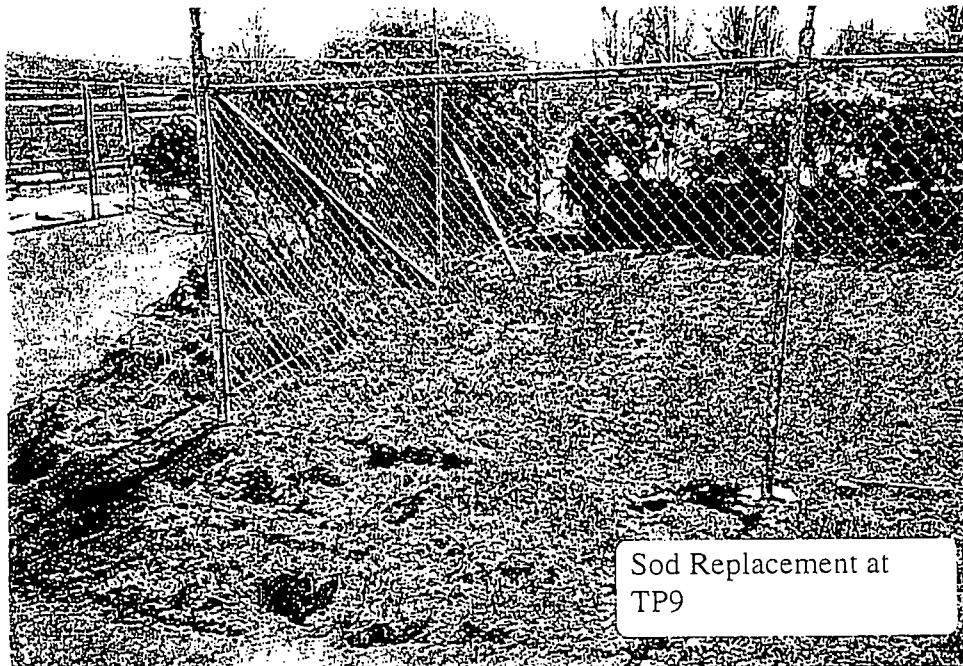








Plastic Sheeting Prior to Hydroseeding at  
TP6 and TP4



Sod Replacement at  
TP9

## **APPENDIX B**

### **Soil Boring Logs**



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-1

Date Hole Started: 03/23/98 Date Hole Finished: 03/23/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: North End of Pilchuck Path

Descriptive Location: North End of Pilchuck Path inside fenced area.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.5

Total Depth Drilled (ft): 6.25

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring drilled with Piper 2000 mounted on F-250. Drilled with 2 1/4" (ID) hollow stem augers. Samples obtained with "A" rod and a 2" (OD) split spoon under a 140 pound, 30 inch drop, safety hammer using a cat head at 0-1' and 6'. Switched to 3" (OD) split spoon at 2-5'. Boring abandoned with bentonite chips, 1' concrete cap with an aluminum ID tag on top. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-363	SS		0.50	0.0 - 1.0' 2" SS		0.0 - 0.2' Asphalt Black asphalt [Road Pavement]
	EVT-9803-364	SS		0.50	1.0 - 2.0' 3" SS		0.2 - 4.0' BRICK, SAND, & GRAVEL Red brick fragments getting larger with depth (3" at 3-4'), slightly moist to dry; Sand is black/white/gray, medium to fine grained (mortar?); Gravel 1" and smaller subrounded to 2".
	EVT-9803-365	SS		0.40	2.0 - 3.0'		[Smelter Debris]
	EVT-9803-366	SS		0.40	3.0 - 4.0'		4.0 - 6.3' BRICK Red, dry, intact with 1/4" gray and white sand layers approximately 3" apart. At 4' Sand appears to be yellow stained.
5	EVT-9803-367	SS		0.90	4.0 - 5.0'		[Smelter Debris]
		SS		0.00	5.0 - 6.0' Refusal @ 5'. Drill to 6' and sample with 2" SS.		
	EVT-9803-368	SS	100	0.25	6.0 - 6.3' 2" SS		
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-2

Date Hole Started: 03/23/98 Date Hole Finished: 03/23/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: North End of Pilchuck Path

Descriptive Location: 5th & Pilchuck Path inside fenced area.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.5

Total Depth Drilled (ft): 7

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring drilled with Piper 2000 mounted on F-250. Drilled with 2 1/4" (ID) hollow stem augers. Samples obtained with "A" rod and a 2" (OD) split spoon under a 140 pound, 30 inch drop, safety hammer using a cat head. Boring abandoned with bentonite chips, 1' concrete cap with a aluminum ID tag on top. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-369	SS		0.80	0.0 - 1.0'		0.0 - 0.2' ASPHALT Black Asphalt [Road Pavement]
	EVT-9803-370	SS		0.80	1.0 - 2.0'		0.2 - 1.0' Gravelly SAND Dark brown, slightly moist to dry, fine to medium grained, medium der with 1" subround to round gravel with trace red brick fragments at 1'. [Road Base Fill]
	EVT-9803-371	SS	9/12	0.80	2.0 - 3.0'		1.0 - 2.0' Sandy SILT Brown, some black staining at 1.5', fine to medium grained, medium dense, slightly moist; trace 1/4" round to subrounded gravel; 1.5" intact red brick chunks; trace wood chunks. [Smelter Debris]
	EVT-9803-372	SS	19/20	0.80	3.0 - 4.0' Duplicate sample 375 at 08:50 4.0 - 5.0' Inadvertently drilled past 4-5' interval.		2.0 - 7.0' Silty SAND Gray-brown with orange mottling at 2-3', slightly moist to dry, medium fine grained, fining with depth, medium dense; trace 1/4" subrounded gravel at 2-3'. [Glacial Till]
5	EVT-9803-373	SS	12/14	0.90	5.0 - 6.0'		
	EVT-9803-374	SS	21/26	0.70	6.0 - 7.0'		
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-3

Date Hole Started: 03/26/98 Date Hole Finished: 03/26/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: North Broadway

Descriptive Location: N side of St., 60' SW of access road.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 4

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-431	SS		0.75	0.0 - 1.0'		0.0 - 1.0' Sandy LOAM
	EVT-9803-432	SS		0.75	1.0 - 2.0'		Brown, moist, roots to 4". 1.0 - 2.3'
	EVT-9803-433	SS		1.00	2.0 - 3.0'		SAND
	EVT-9803-434	SS		1.00	3.0 - 4.0'		Gray, moist, medium to coarse grained, loose. 2.3 - 4.0' SILT
							Gray, dry, hard, with 1" round to subround gravel. (Glacial Till)
5							
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-4

Date Hole Started: 03/25/98 Date Hole Finished: 03/25/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: End of North Pilchuck

Descriptive Location: West side behind last foundation.

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 6

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-391	SS		0.75	0.0 - 1.0'		0.0 - 1.0' Silty LOAM Dark Brown, moist to slightly moist, roots to 4", trace brick fragme. 1". [Fill]
	EVT-9803-392	SS		0.75	1.0 - 2.0'		1.0 - 2.0' Sandy SILT Dark brown to yellow brown, slightly moist to dry.; Sand is fine graine. trace 1/2" subrounded gravel; Brick fragments 2" chunk of wood at top. [Smelter Debris]
	EVT-9803-393	SS		1.00	2.0 - 3.0'		2.0 - 6.0' Silty SAND Grayish brown (orange brown at top) with bands of oxidational 2-3', slightly moist to dry, medium to fine grained, trace root matter to 4"; Trace 2" and smaller subrounded gravel. [Glacial Till]
	EVT-9803-394	SS		1.00	3.0 - 4.0'		
5	EVT-9803-395	SS		0.75	4.0 - 5.0' Duplicate sample EVT-9803-397 at 0830		
	EVT-9803-396	SS		0.75	5.0 - 6.0'		
10							
15							
20							

GEOTECH EVTSA-1.GPJ HYD-TUC.GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-5

Date Hole Started: 03/24/98 Date Hole Finished: 03/24/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: Intersection at 5th and Alley betw

Descriptive Location: Just inside gate of fenced area.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.5

Total Depth Drilled (ft): 15

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Mar Vw Dr & Pilchuck

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft. to 6'; 2' thereafter

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring drilled with Piper 2000 mounted on F-250. Drilled with 2 1/4" (ID) hollow stem augers. Samples obtained with "A" rod and a 2" (OD) split spoon under a 140 pound, 30 inch drop, safety hammer using a cat head. Boring abandoned with bentonite chips, 1' concrete cap with an aluminum ID tag on top. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-376	SS	6/8	0.75	0.0 - 1.0'		0.0 - 1.0' Silty LOAM
	EVT-9803-377	SS	27/50-2"	0.75	1.0 - 2.0'		Dark Brown, slightly moist, root matter, trace 1/2" subrounded to rounded gravel. [Fill]
	EVT-9803-378	SS	100-5"	0.30	2.0 - 3.0' Difficult drilling; Brick tends to crumble and plug augers.		1.0 - 8.0' BRICK
	EVT-9803-379	SS	200-6"	0.50	3.0 - 4.0'		Red, dry, hard, intact, with 1/4" layers of white and gray sand 3" apart. (mortar) [Smelter Debris]
5	EVT-9803-380	SS	100-3"	0.40	4.0 - 5.0'		
	EVT-9803-381	SS	100-3"	0.50	5.0 - 6.0'		
	EVT-9803-382	SS	15/24	0.70	8.0 - 9.0'		8.0 - 15.0' Silty SAND
10							Gray to brown, trace dark orange staining, slightly moist to dry, fine grained to silty, medium dense to very dense (becomes more dense with depth). [Glacial Till]
	EVT-9803-383	SS	22/31	0.80	11.0 - 12.0'		
15	EVT-9803-384	SS	23/100-5"	0.80	14.0 - 15.0'		
20							

GEOTECH EVT/SA-1-1-98 HYD-TUC.GDT 8/5/98

HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

SA-5

11-12'

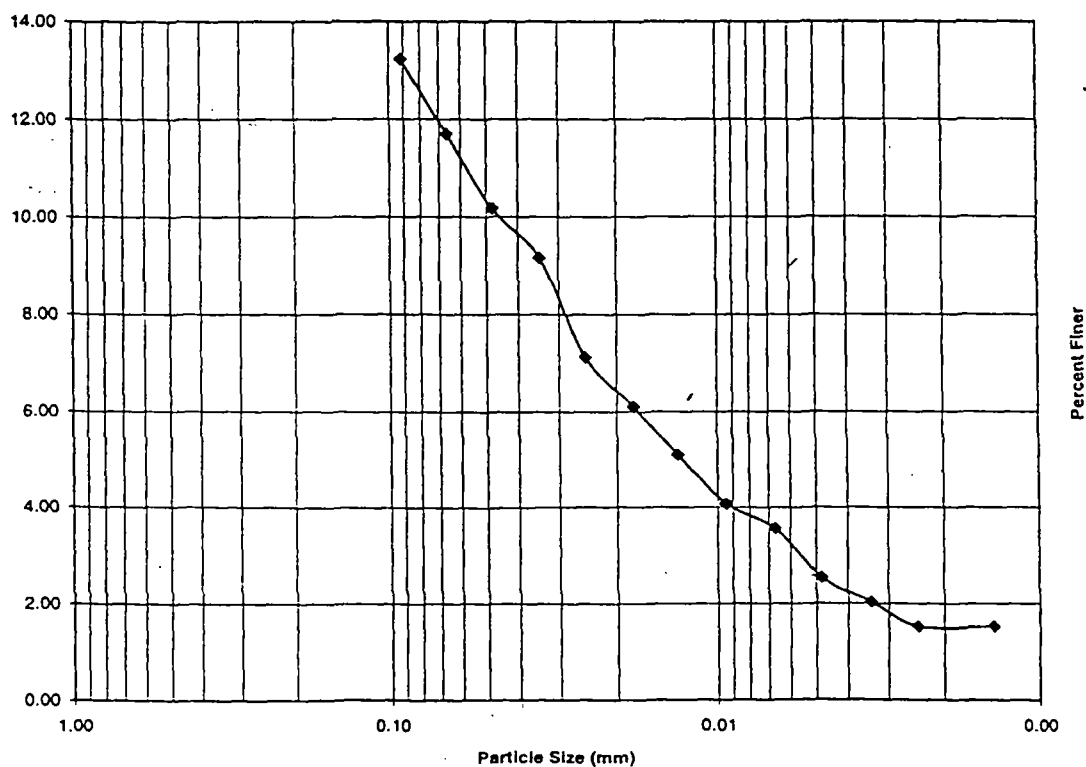
# HYDROMETER ANALYSIS

LABORATORY NUMBER  
SAMPLE NUMBER  
DATE  
ANALYST

98R-00972  
EVT-9803-383  
6/25/98  
SM

Time	Reading	Rcp	% Finer	Rcl	L	A	D	% Finer of Total
0.25	31	26	90.66	32	11.2	0.0137	0.09	13.23
0.5	28	23	80.20	29	11.7	0.0137	0.07	11.70
1	25	20	69.74	26	12.2	0.0137	0.05	10.17
2	23	18	62.76	24	12.6	0.0137	0.03	9.16
4	19	14	48.81	20	13.2	0.0137	0.02	7.12
8	17	12	41.84	18	13.5	0.0137	0.02	6.10
15	15	10	34.87	16	13.8	0.0137	0.01	5.09
30	13	8	27.89	14	14.2	0.0137	0.01	4.07
60	12	7	24.41	13	14.3	0.0137	0.01	3.56
120	10	5	17.43	11	14.7	0.0137	0.00	2.54
240	9	4	13.95	10	14.8	0.0137	0.00	2.03
480	8	3	10.46025105	9	15	0.0137	0.00	1.53
1440	8	3	10.46025105	9	15	0.0137	0.00	1.53

Hydrometer Particle Size Distribution



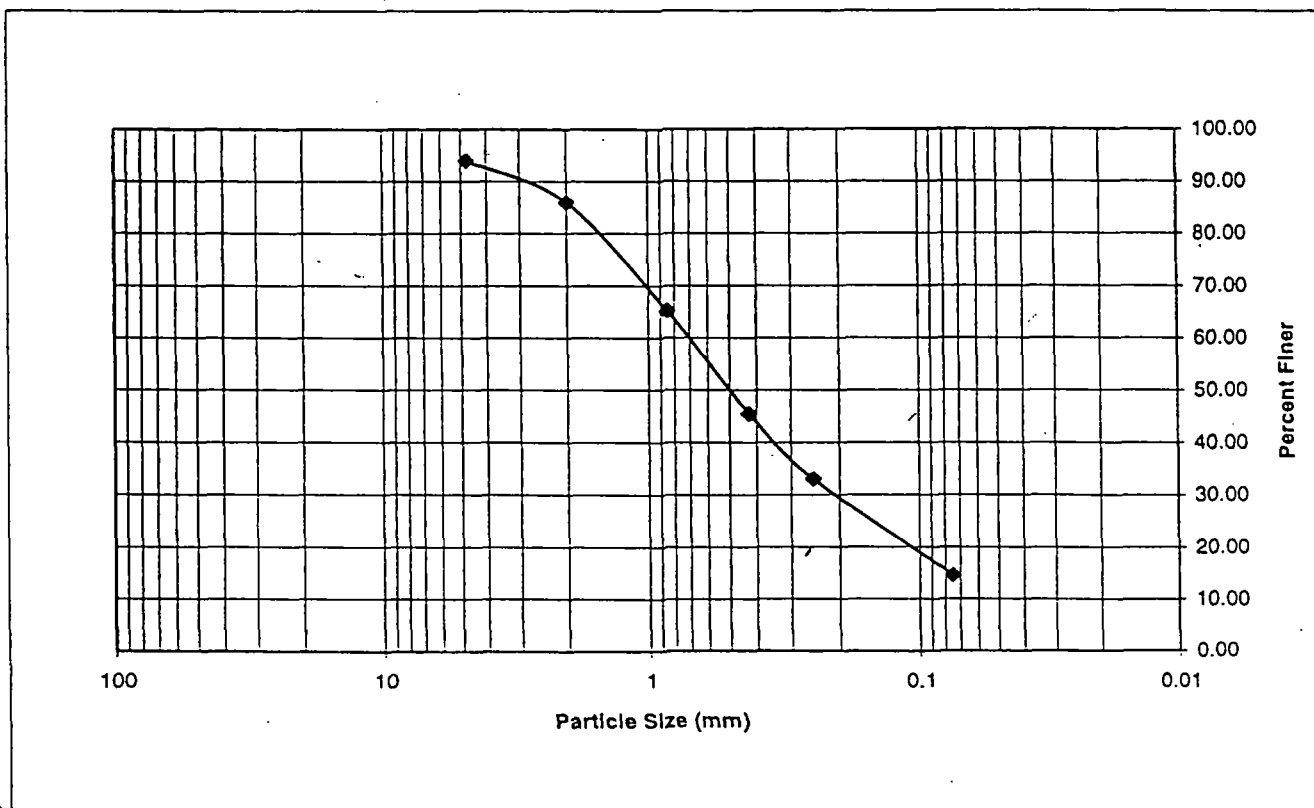
HYDROMETRICS, INC.  
 RUSTON LABORATORY  
 5227 NORTH 49TH STREET  
 RUSTON, WASHINGTON 98407

Laboratory Number: 98R-00972  
 Sample Number: EVT-9803-383  
 Date: 6/25/98

Weight of Oven Dry Sample (g): 194

<u>Sieve Number</u>	<u>Sieve Opening (mm)</u>	<u>Weight Retained</u>			
4	4.75	11.7	6.03	6.03	93.97
10	2.00	15.60	8.04	14.07	85.93
20	0.85	40.20	20.72	34.79	65.21
40	0.425	38.30	19.74	54.54	45.46
60	0.250	24.20	12.47	67.01	32.99
200	0.075	35.70	18.40	85.41	14.59
PAN	< 0.075	28.70	14.79		

sum = 194.4





# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-6

Date Hole Started: 03/21/98 Date Hole Finished: 03/22/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: E of Pilchuck Alley

Descriptive Location: At former Arsenic ovens

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.5

Total Depth Drilled (ft): 11

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft. to 6'; 2' thereafter

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring drilled with Acker Drill mounted on Bobcat. Drilled with 2 1/4" (ID) hollow stem augers. Samples obtained with "A" rod and a 2" (OD) split spoon under a 140 pound, 30 inch drop, safety hammer using a cat head. Boring abandoned with bentonite chips, 1' concrete cap with aluminum ID tag on top. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-353	SS	4/8	0.60	0.0 - 1.0' Refusal at 2". Moved 4' NW; Duplicate sample		0.0 - 1.5' Silty LOAM
	EVT-9803-354	SS	12/12	0.60	EVT-9803-358 @ 1100. 1.0 - 2.0' White substance (gypsum like) in side wall of first hole. sample		Brown, slightly moist, with organic matter.
	EVT-9803-356	SS	4/7	0.40	EVT-9803-355 @ 1000 2.0 - 3.0'		1.5 - 4.0' BRICK
	EVT-9803-357	SS	20/13	0.40	3.0 - 4.0'		Red, slightly moist to dry, trace gravel with white material fragments. (same as sample EVT-9803-353) [Smelter Debris]
5	EVT-9803-359	SS	4/26	0.70	4.0 - 5.0' Difficult Drilling		4.0 - 9.0' Silty SAND
	EVT-9803-360	SS	37/34	0.70	5.0 - 6.0'		Yellow brown grading to gray with depth, some oxidation mottling, slightly moist, medium to fine grained, medium dense to dense, some subrounded 1' gravel. [Glacial Till]
	EVT-9803-361	SS	14/17/32	1.20	7.5 - 9.0'		
10		SS	50/99-2"	0.00	10.0 - 11.0' No Recovery no sample.		
15							
20							

GEOTECH EVISA-1.GPJ HYD-TUC GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-7

Date Hole Started: 03/19/98 Date Hole Finished: 03/19/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: E of Pilchuck Alley

Descriptive Location: At former Arsenic mill storage bins

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.5

Total Depth Drilled (ft): 11

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-344	SS		0.30	0.0 - 1.0'		0.0 - 2.0' <b>Silty LOAM</b> Dark brown, slightly moist to dry, some medium grained sand, organic matter. Trace brick fragments at 2'. [Fill]
	EVT-9803-345	SS		0.30	1.0 - 2.0'		
	EVT-9803-346	SS	13/8	0.40	2.0 - 3.0'		2.0 - 6.5' <b>Sandy SILT</b> Light brown to gray brown, with some orange mottling, medium dense, slightly moist to dry, some 1" subrounded gravel. [Fill]
	EVT-9803-347	SS	13/8	0.40	3.0 - 4.0'		
5	EVT-9803-348	SS	15/30	0.80	4.0 - 5.0' Slow Drilling with Acker		
	EVT-9803-349	SS	45/50	0.80	5.0 - 6.0' Duplicate sample number EVT-9803-350 @ 1437		
	EVT-9803-351	SS	32/50	0.80	7.5 - 9.0'		6.5 - 11.0' <b>Silty SAND w/ Gravel</b> Gray to brown, slightly moist to dry, fine grained to silt, dense to very dense (ore dense with depth), trace vegetative matter, some 1/4" subrounded gravel. [Glacial Till]
10	EVT-9803-352	SS	100-6"	0.50	10.0 - 11.0'		
15							
20							

GEOTECH EVTSA-1 HYD-TUC.GDT 8/5/98

SA-7  
10-10.5'

HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

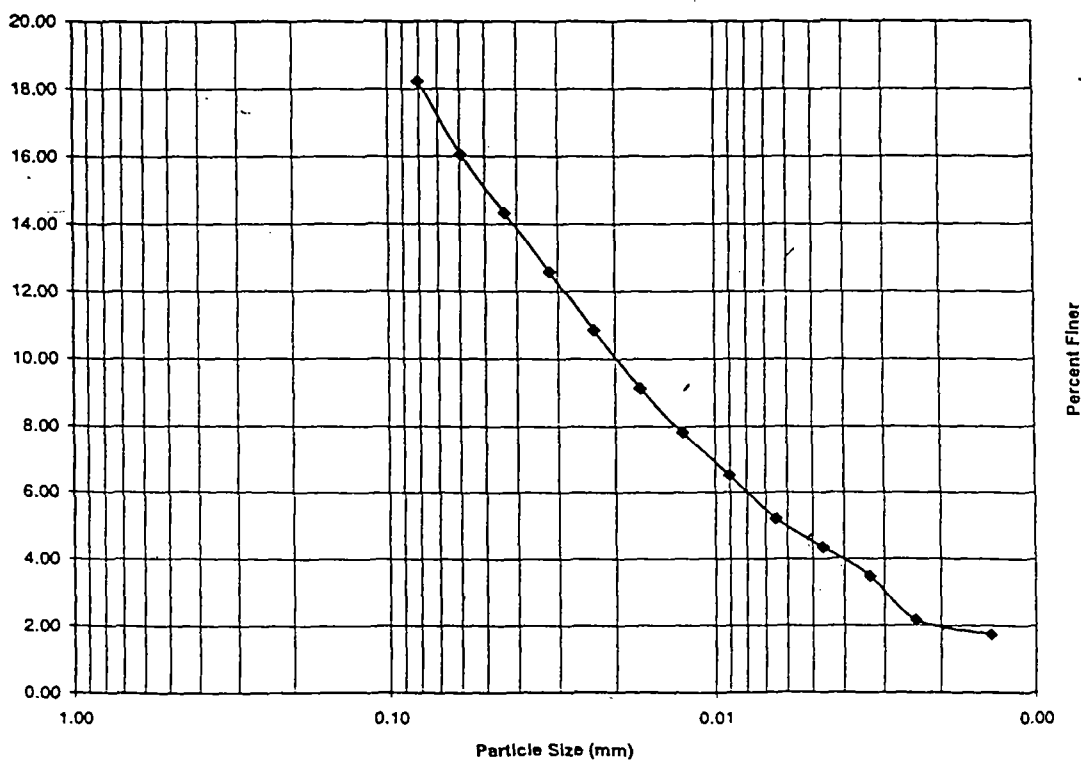
# HYDROMETER ANALYSIS

LABORATORY NUMBER  
SAMPLE NUMBER  
DATE  
ANALYST

98R-00907  
EVT-9803-352  
6/29/98  
SM

Time	Reading	Rcp	% Finer	Rcl	L	A	D	% Finer of Total
0.25	47	42	91.98	48	8.6	0.0137	0.08	18.23
0.5	42	37	81.03	43	9.4	0.0137	0.06	16.06
1	38	33	72.27	39	10.1	0.0137	0.04	14.32
2	34	29	63.51	35	10.8	0.0137	0.03	12.59
4	30	25	54.75	31	11.4	0.0137	0.02	10.85
8	26	21	45.99	27	12	0.0137	0.02	9.12
15	23	18	39.42	24	12.5	0.0137	0.01	7.81
30	20	15	32.85	21	13	0.0137	0.01	6.51
60	17	12	26.28	18	13.5	0.0137	0.01	5.21
120	15	10	21.90	16	13.8	0.0137	0.00	4.34
240	13	8	17.52	14	14.2	0.0137	0.00	3.47
480	10	5	10.95	11	14.7	0.0137	0.00	2.17
1440	9	4	8.76	10	14.8	0.0137	0.00	1.74

Hydrometer Particle Size Distribution



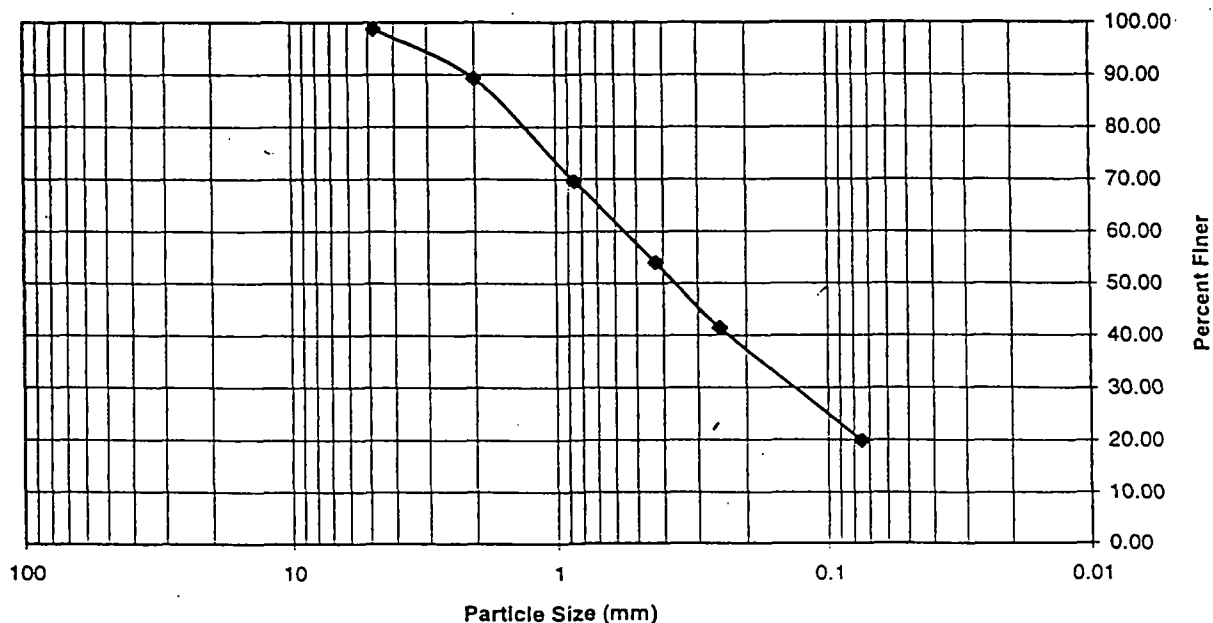
HYDROMETRICS, INC.  
 RUSTON LABORATORY  
 5227 NORTH 49TH STREET  
 RUSTON, WASHINGTON 98407

Laboratory Number: 98R-00907  
 Sample Number: EVT-9803-352  
 Date: 6/25/98

Weight of Oven Dry Sample (g): 194

Sieve Number	Sieve Opening (mm)	Weight Retained			
4	4.75	3	1.32	1.32	98.68
10	2.00	21.50	9.43	10.74	89.26
20	0.85	44.90	19.68	30.43	69.57
40	0.425	35.60	15.61	46.03	53.97
60	0.250	28.60	12.54	58.57	41.43
200	0.075	49.30	21.61	80.18	19.82
PAN	< 0.075	45.50	19.95		

Sum = 194.4





# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-8

Date Hole Started: 03/18/98 Date Hole Finished: 03/18/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 535 Pilchuck Path

Descriptive Location: NW corner of front yard

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

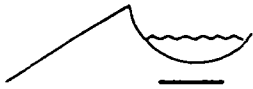
Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-305	SS		0.70	0.0 - 1.0'		0.0 - 2.0' Silty Gravelly SAND Brown to yellowish brown, slightly moist to dry, fine grained to silt, medium dense to loose, 2" and smaller subrounded gravel. (Fill)
	EVT-9803-306	SS		0.70	1.0 - 2.0'		2.0 - 4.0' Gravelly Silty SAND Grayish brown, with some orange mottling, fine grained to medium grained, slightly moist to dry, some 2" and smaller subangular to subrounded gravel. (Glacial Till)
	EVT-9803-307	SS		0.75	2.0 - 3.0'		4.0 - 5.0' Sandy SILT Gray mottled brown, coarse grained, dry, dense, trace subangular gravel. (Glacial Till)
	EVT-9803-308	SS		0.75	3.0 - 4.0'		
	EVT-9803-309	SS		1.00	4.0 - 5.0'		
5							
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-9

Date Hole Started: 03/18/98 Date Hole Finished: 03/18/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 535 Pilchuck Path

Descriptive Location: NE corner of back yard

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-300	SS		0.60	0.0 - 1.0'		0.0 - 3.0' Silty SAND Dark brown with some yellowish orange mottling, slightly moist, some root matter, medium dense to loose. Some wood chips at 3'. [Fill]
	EVT-9803-301	SS		0.50	1.0 - 2.0'		
	EVT-9803-302	SS		0.40	2.0 - 3.0'		
	EVT-9803-303	SS		0.40	3.0 - 4.0'		3.0 - 5.0' Silty SAND Brown to orange, medium to fine grained, slightly moist to dry, loose to medium dense some 3" and smaller subrounded gravel. [Glacial Till]
5	EVT-9803-304	SS		1.40	4.0 - 5.0'		
10							
15							
20							

GEOTECH EVTSA-01 HYD-TUC.GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-10

Date Hole Started: 03/19/98 Date Hole Finished: 03/19/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Taylor

Legal Description: 538 E Marine View Dr

Descriptive Location: NE corner of front yard

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

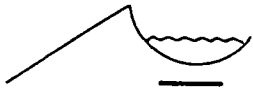
Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-325B	SS		0.50	0.0 - 1.0'		0.0 - 1.0' Silty LOAM Dark brown, slightly moist, trace rounded to subrounded gravel, silt root matter, loose.
	EVT-9803-326	SS		0.50	1.0 - 2.0'		
	EVT-9803-327	SS		0.40	2.0 - 3.0'		
	EVT-9803-328	SS		0.40	3.0 - 4.0' Duplicate sample at 10:12 EVT-9803-329		
	EVT-9803-330	SS		0.60	4.0 - 5.0'		1.0 - 5.0' Silty SAND Orange-brown grading to gray-brown with depth, mottled orange; slight moist to dry, medium to fine grained; medium dense to loose; trace 2" and smaller gravel.
5							[Fill]
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-11

Date Hole Started: 03/18/98 Date Hole Finished: 03/18/98

Client: Asarco  
Project: Smelter Area Investigation  
County: Snohomish State: WA  
Property Owner: Asarco  
Legal Description: 541 Pilchuck Path  
Descriptive Location: NE portion of back yard

Recorded By: J Swortz  
Drilling Company: Hydrometrics, Inc.  
Driller: J Niederkorn  
Drilling Method: Split Spoon  
Drilling Fluids Used: None  
Purpose of Hole: Source Area Investigation  
Target Aquifer: N/A  
Hole Diameter (in): 3.0  
Total Depth Drilled (ft): 5

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	N		
Surface Casing Used?	N		
Screen/Perforations?	N		
Sand Pack?	N		
Annular Seal?	N		
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	N		
Water Samples Taken?	N		
Boring Samples Taken?	Y	Metals Analysis	1 ft.

Static Water Level Below MP: N/A	Surface Casing Height (ft):
Date: N/A	Riser Height (ft):
MP Description: Ground Surface	Ground Surface Elevation (ft):
MP Height Above or Below Ground (ft): N/A	MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-310	SS		0.70	0.0 - 1.0'		0.0 - 1.0' Sandy LOAM Dark brown, slightly moist, some organics, trace subrounded gravel. [Fill]
	EVT-9803-311	SS		0.70	1.0 - 2.0'		1.0 - 4.0' Silty SAND Light brown, slightly moist to moist, fine to medium grained, medium to fine grained, medium to loose, trace wood fibers, oxidized in bands. [Fill]
	EVT-9803-312	SS		0.80	2.0 - 3.0'		
	EVT-9803-313	SS		0.80	3.0 - 4.0'		
5	EVT-9803-314	SS		0.60	4.0 - 5.0'		4.0 - 5.0' Silty SAND Gray, fine to coarse grained, slightly moist to dry, dense, trace gravel subrounded. [Glacial Till]
10							
15							
20							

HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

SA-11  
4-5'

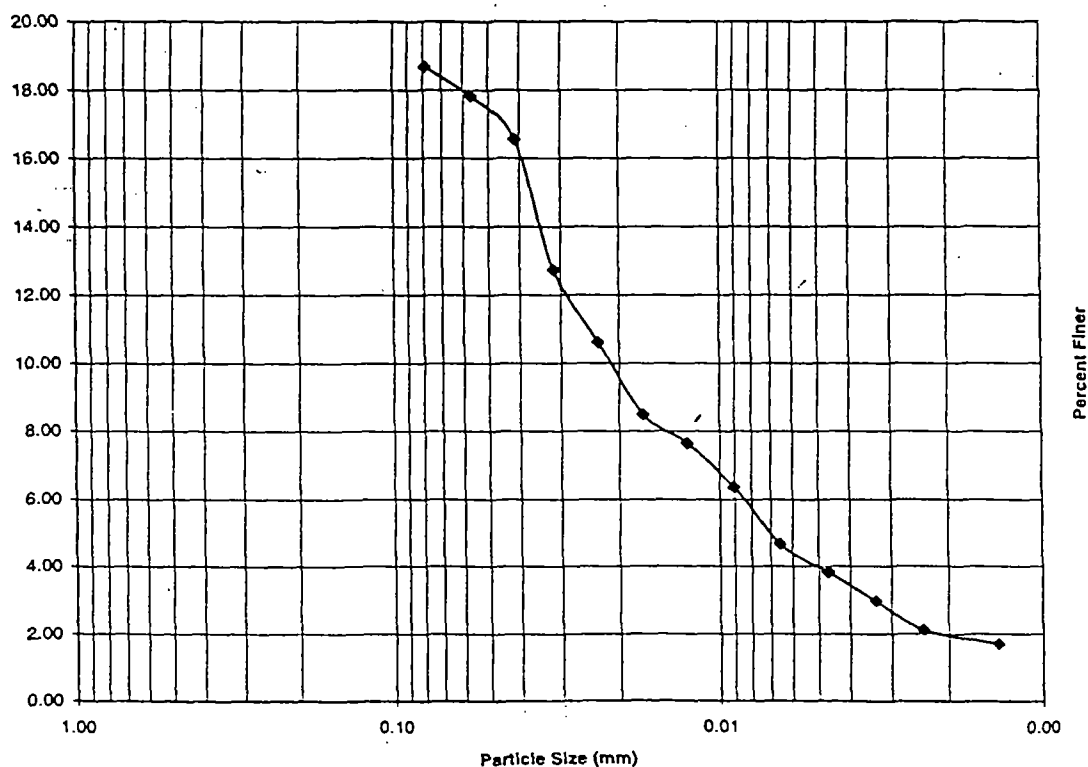
# HYDROMETER ANALYSIS

LABORATORY NUMBER  
SAMPLE NUMBER  
DATE  
ANALYST

98R-00873  
EVT-9803-314  
6/25/98  
SM

Time	Reading	Rcp	% Finer	Rci	L	A	D	% Finer of Total
0.25	49	44	88.00	50	8.3	0.0137	0.08	18.67
0.5	47	42	84.00	48	8.6	0.0137	0.06	17.82
1	44	39	78.00	45	9.1	0.0137	0.04	16.55
2	35	30	60.00	36	10.6	0.0137	0.03	12.73
4	30	25	50.00	31	11.4	0.0137	0.02	10.61
8	25	20	40.00	26	12.2	0.0137	0.02	8.49
15	23	18	36.00	24	12.5	0.0137	0.01	7.64
30	20	15	30.00	21	13	0.0137	0.01	6.37
60	16	11	22.00	17	13.7	0.0137	0.01	4.67
120	14	9	18.00	15	14	0.0137	0.00	3.82
240	12	7	14.00	13	14.3	0.0137	0.00	2.97
480	10	5	10.00	11	14.7	0.0137	0.00	2.12
1440	9	4	8	10	14.8	0.0137	0.00	1.70

Hydrometer Particle Size Distribution



HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
RUSTON, WASHINGTON 98407

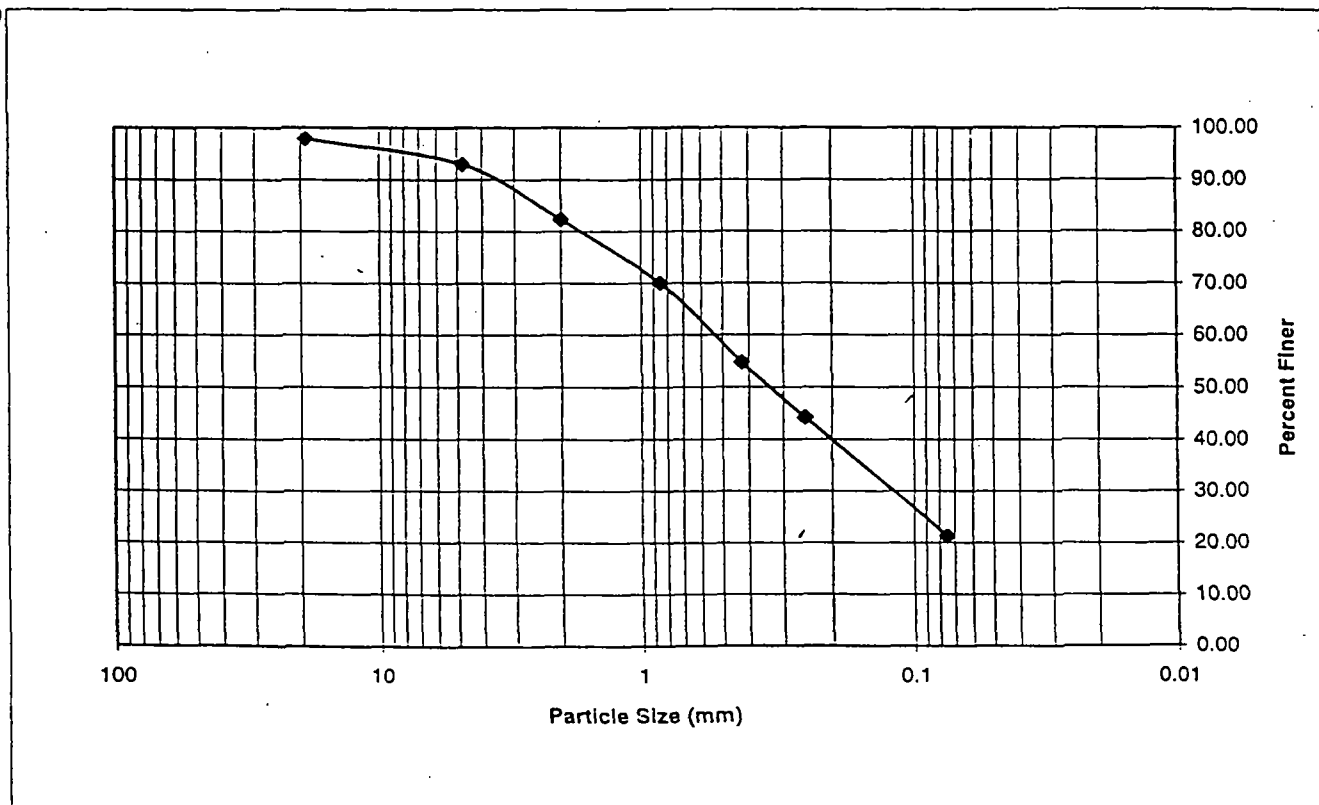
Laboratory Number: 98R-00873  
Sample Number: EVT-9803-314  
Date: 6/25/98

Weight of Oven Dry Sample (g):

<u>Sieve Number</u>	<u>Sieve Opening (mm)</u>	<u>Weight Retained</u>	<u>Percent Retained</u>	<u>Cumulative Retained</u>	<u>Percent Finer</u>
.75 inch	19.05	16.7	2.15	2.15	97.85
4	4.75	38.20	4.91	7.06	92.94
10	2.00	82.80	10.65	17.71	82.29
20	0.85	95.60	12.29	30.00	70.00
40	0.425	118.30	15.21	45.22	54.78
60	0.25	82.60	10.62	55.84	44.16
200	0.075	178.40	22.94	78.78	21.22
PAN	< 0.075	163.40	21.01		

sum =

776





# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-12

Date Hole Started: 03/19/98 Date Hole Finished: 03/19/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Taylor

Legal Description: 538 E Marine View Dr

Descriptive Location: Between driveway from alley and parking strip.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-339	SS		0.70	0.0 - 1.0'		0.0 - 1.0' Silty SAND Dark brown, medium to fine grained, some 1/2" subangular gravel, slightly moist to dry, loose, some vegetative matter. (Fill)
	EVT-9803-340	SS		0.70	1.0 - 2.0'		1.0 - 2.0' Gravelly Sandy SILT Reddish brown, slightly moist to dry, silt to fine grained sand; Brick fragments, some charred wood.; some 1" subrounded gravel. (Smelter Debris)
	EVT-9803-341	SS		0.70	2.0 - 3.0'		2.0 - 5.0' Gravelly SAND & SILT Orange Brown grading to Brown gray some orange mottling; Silt grad: to Sand, root matter, medium dense, moist at 2' dry at 4'; 2" and smaller rounded to subrounded gravel. (Fill)
	EVT-9803-342	SS		0.70	3.0 - 4.0'		
	EVT-9803-343	SS		1.00	4.0 - 5.0'		
5							
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-13

Date Hole Started: 03/25/98 Date Hole Finished: 03/25/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 511 Hawthorne

Descriptive Location: Adjacent to N driveway to former house

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
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Well Installed?	N		
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Surface Casing Used?	N		
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Screen/Perforations?	N		
----------------------	---	--	--

Sand Pack?	N		
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Annular Seal?	N		
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Surface Seal?	N		
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DEVELOPMENT/SAMPLING
----------------------

Well Developed?	N
-----------------	---

Water Samples Taken?	N
----------------------	---

Boring Samples Taken?	Y	Metals Analysis	1 ft.
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Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on a Piper 2000 Drill mounted on a pickup. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-414	SS		0.60	0.0 - 1.0'		0.0 - 2.0' Sandy SILT Dark Brown, slightly moist, roots at 0-1', loose, trace 1/4" and smaller gravel. [Fill]
	EVT-9803-415	SS		0.60	1.0 - 2.0'		
	EVT-9803-416	SS		0.70	2.0 - 3.0'		2.0 - 5.0' Sandy SILT Light brown to orange-brown with orange mottling, moist to slightly moist, some vegetative matter, medium dense. [Glacial Till]
	EVT-9803-417	SS		0.70	3.0 - 4.0' Duplicate sample #419 @ 15:00		
	EVT-9803-418	SS		0.80	4.0 - 5.0'		
5							
10							
15							
20							

GEOTECH EVTS: J HYD-TUC.GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-14

Date Hole Started: 03/24/98 Date Hole Finished: 03/24/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 516 Hawthorne

Descriptive Location: Front Yard

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on a Piper 2000 Drill mounted on a pickup. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-385	SS		0.70	0.0 - 1.0' Duplicate sample at 17:05 # 390		0.0 - 1.0' Sandy SILT Light brown, moist, organic matter, moist. (Fill)
	EVT-9803-386	SS		0.70	1.0 - 2.0'		1.0 - 3.0' Silty SAND Orange-brown, slightly moist to moist, med to fine grained, some ban of oxidation; trace 1/4" subrounded gravel. (Fill)
	EVT-9803-387	SS		0.75	2.0 - 3.0'		3.0 - 5.0' Silty SAND Gray, very fine to fine grained, slightly moist to moist; Some 1" subrounded gravel. (Glacial Till)
	EVT-9803-388	SS		0.75	3.0 - 4.0'		
	EVT-9803-389	SS		1.20	4.0 - 5.0'		
5							
10							
15							
20							

GEOTECH EVTSA-1 GPJ HYD-TUC.GDT 7/13/98

54-14  
3-4'

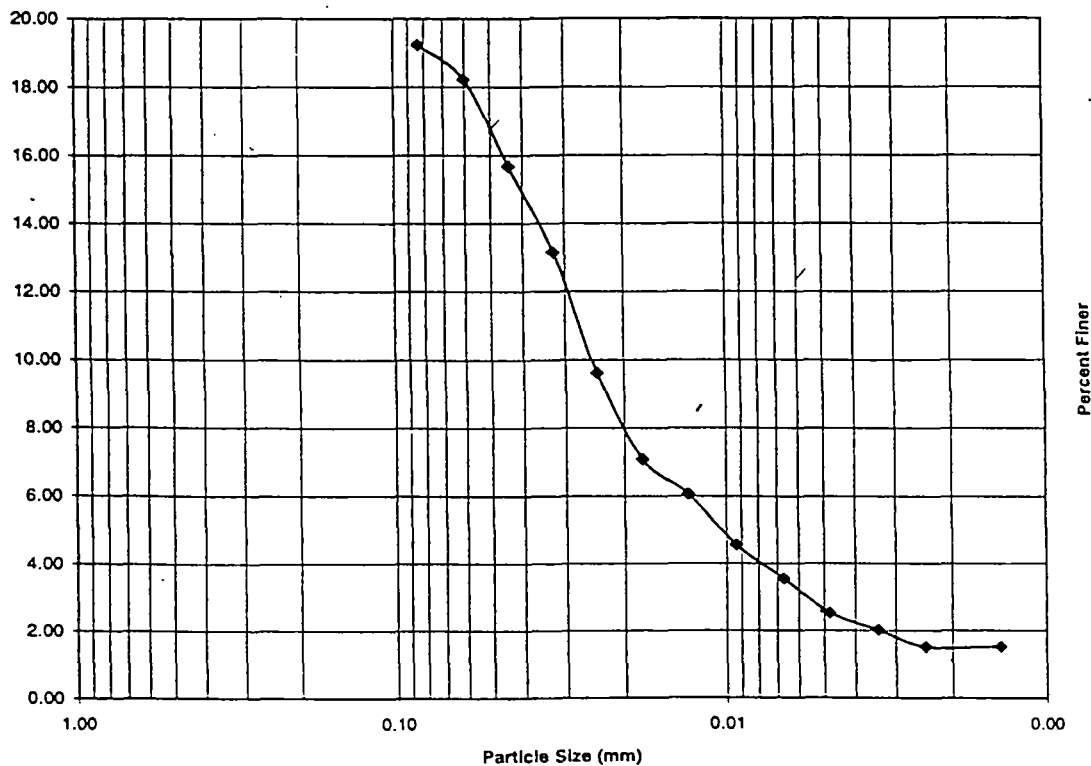
HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

### HYDROMETER ANALYSIS

LABORATORY NUMBER	98R-00977
SAMPLE NUMBER	EVT-9803-388
DATE	6/25/98
ANALYST	SM

Time	Reading	Rcp	% Finer	Rcl	L	A	D	% Finer of Total
0.25	43	38	76.00	44	9.3	0.0137	0.08	19.23
0.5	41	36	72.00	42	9.6	0.0137	0.06	18.22
1	36	31	62.00	37	10.4	0.0137	0.04	15.69
2	31	26	52.00	32	11.2	0.0137	0.03	13.16
4	24	19	38.00	25	12.4	0.0137	0.02	9.61
8	19	14	28.00	20	13.2	0.0137	0.02	7.08
15	17	12	24.00	18	13.4	0.0137	0.01	6.07
30	14	9	18.00	15	14	0.0137	0.01	4.55
60	12	7	14.00	13	14.3	0.0137	0.01	3.54
120	10	5	10.00	11	14.7	0.0137	0.00	2.53
240	9	4	8.00	10	14.8	0.0137	0.00	2.02
480	8	3	6	9	15	0.0137	0.00	1.52
1440	8	3	6	9	15	0.0137	0.00	1.52

Hydrometer Particle Size Distribution



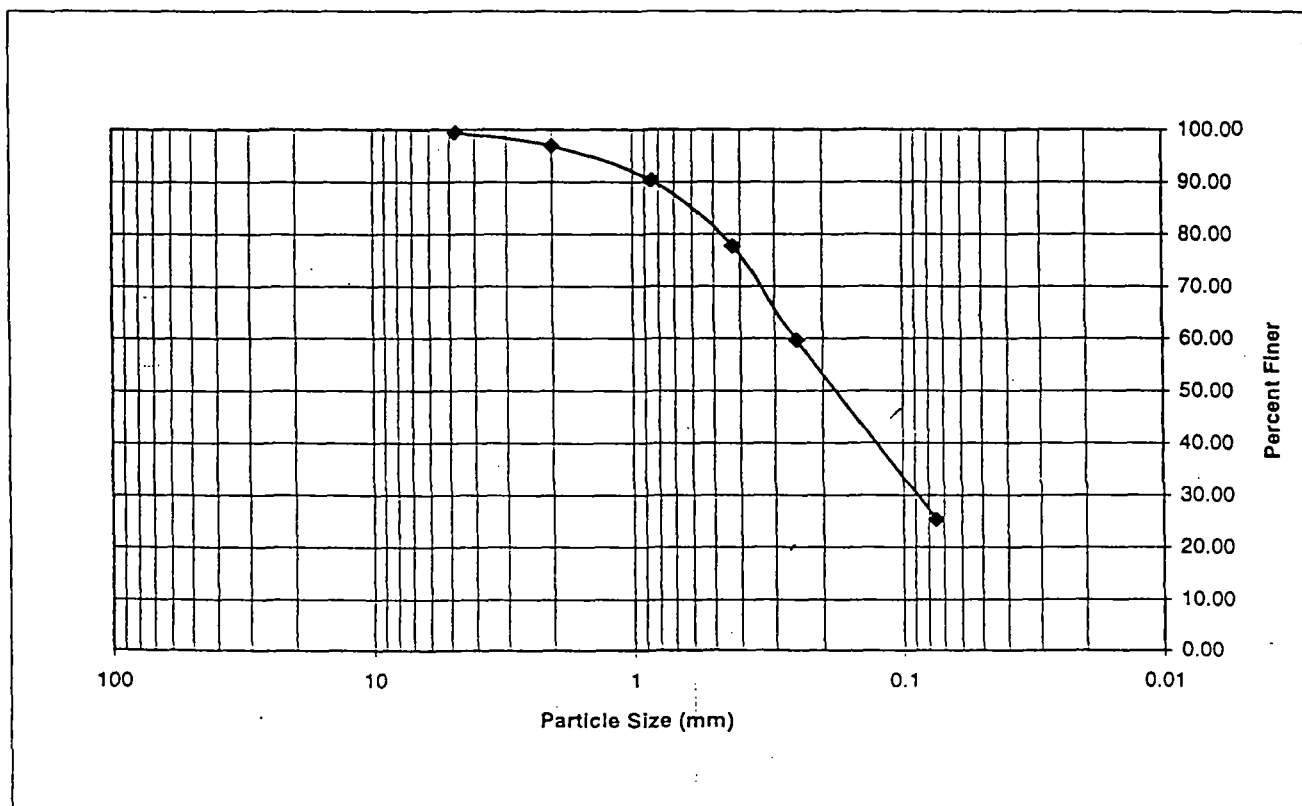
HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
RUSTON, WASHINGTON 98407

Laboratory Number: 98R-00977  
Sample Number: EVT-9803-388  
Date: 6/25/98

Weight of Oven Dry Sample (g): 678.5

<u>Sieve Number</u>	<u>Sieve Opening (mm)</u>	<u>Weight Retained</u>	<u>Percent Retained</u>	<u>Cumulative Retained</u>	<u>Percent Finer</u>
4	4.75	4.2	0.62	0.62	99.38
10	2.00	16.90	2.51	3.13	96.87
20	0.85	44.30	6.57	9.70	90.30
40	0.425	84.70	12.56	22.26	77.74
60	0.250	122.10	18.10	40.36	59.64
200	0.075	231.60	34.34	74.70	25.30
PAN	< 0.075	174.70	25.90		

sum = 678.5



SA-14

4-5'

HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

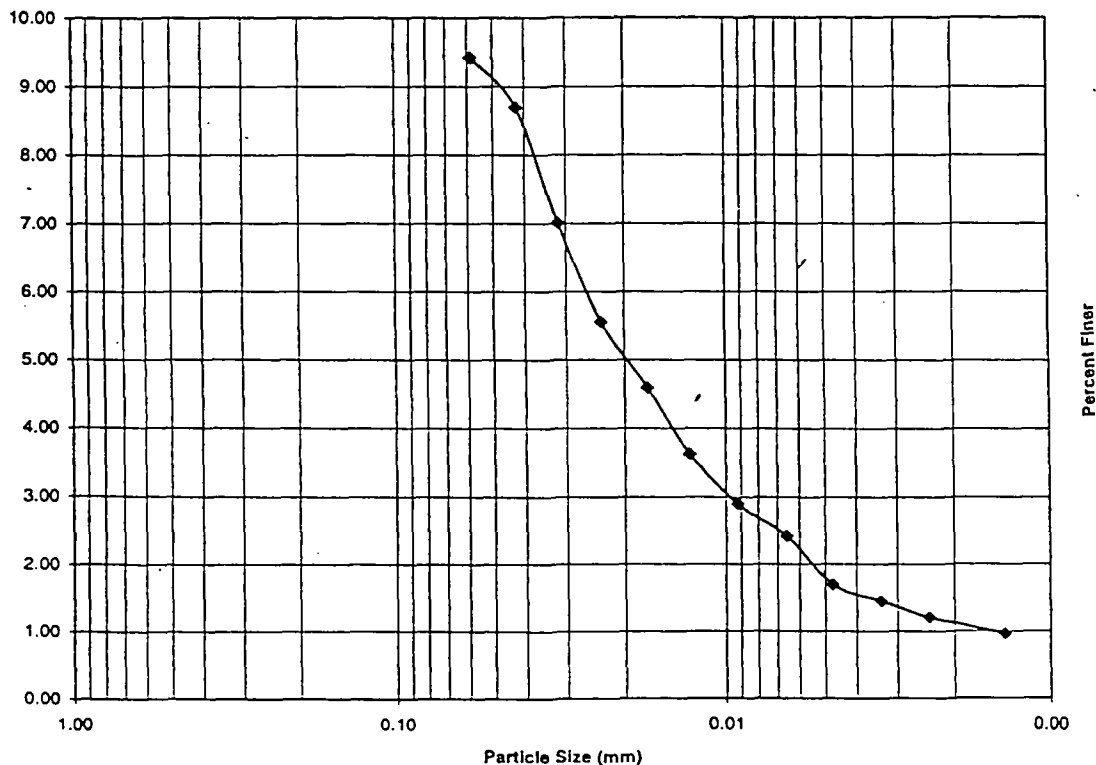
# HYDROMETER ANALYSIS

LABORATORY NUMBER  
SAMPLE NUMBER  
DATE  
ANALYST

98R-00978  
EVT-9803-389  
6/25/98  
SM

Time	Reading	Rcp	% Finer	Rcl	L	A	D	% Finer of Total
0.25	47	42	84.00	48	8.6	0.0137	0.08	10.15
0.5	44	39	78.00	45	9.1	0.0137	0.06	9.42
1	41	36	72.00	42	9.6	0.0137	0.04	8.70
2	34	29	58.00	35	10.7	0.0137	0.03	7.01
4	28	23	46.00	29	11.7	0.0137	0.02	5.56
8	24	19	38.00	25	12.4	0.0137	0.02	4.59
15	20	15	30.00	21	13	0.0137	0.01	3.62
30	17	12	24.00	18	13.5	0.0137	0.01	2.90
60	15	10	20.00	16	13.8	0.0137	0.01	2.42
120	12	7	14.00	13	14.3	0.0137	0.00	1.69
240	11	6	12.00	12	14.5	0.0137	0.00	1.45
480	10	5	10	11	14.7	0.0137	0.00	1.21
1440	9	4	8	10	14.8	0.0137	0.00	0.97

Hydrometer Particle Size Distribution



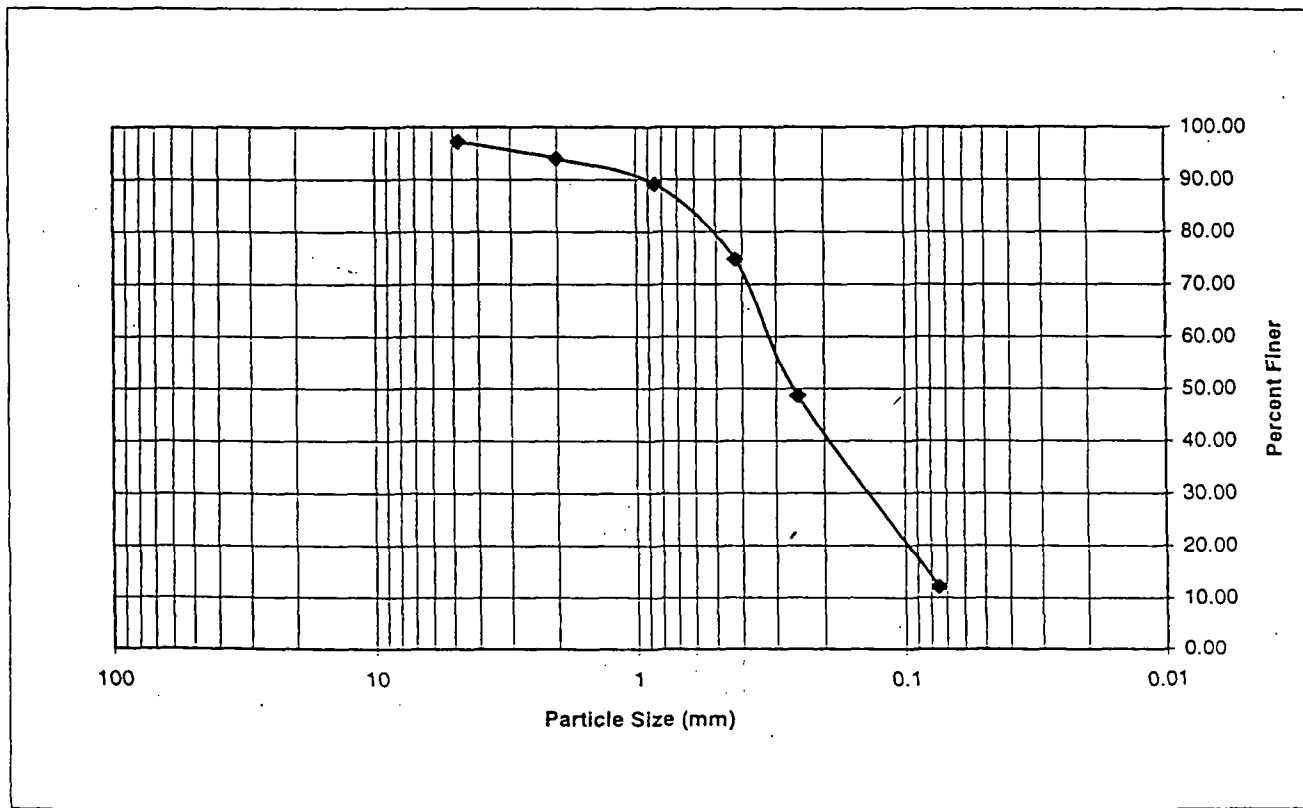
HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
RUSTON, WASHINGTON 98407

Laboratory Number: 98R-00978  
Sample Number: EVT-9803-389  
Date: 6/25/98

Weight of Oven Dry Sample (g): 773.2

<u>Sieve Number</u>	<u>Sieve Opening (mm)</u>	<u>Weight Retained</u>	<u>Percent Retained</u>	<u>Cumulative Retained</u>	<u>Percent Finer</u>
4	4.75	21.3	2.75	2.75	97.25
10	2.00	25.10	3.25	6.00	94.00
20	0.85	37.50	4.85	10.85	89.15
40	0.425	111.20	14.38	25.23	74.77
60	0.250	201.90	26.11	51.35	48.65
200	0.075	282.80	36.58	87.92	12.08
PAN	< 0.075	94.50	12.22		

sum = 774.3





# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-15

Date Hole Started: 03/25/98 Date Hole Finished: 03/25/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: City of Everett

Legal Description: R/W Hawthorne St.

Descriptive Location: Asphalt parking strip in front of 522 Hawthorne

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on a Piper 2000 Drill mounted on a pickup. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-398	SS		0.65	0.0 - 1.0'		0.0 - 2.0' Silty SAND Orange-brown to light brown some orange mottling, medium to fine grained, dry, medium dense; Trace red brick, and wood. [Smelter Debris]
	EVT-9803-399	SS		0.65	1.0 - 2.0'		
	EVT-9803-400	SS		0.70	2.0 - 3.0'		2.0 - 5.0' Silty SAND Grayish brown mottled orange (diminishes with depth), medium to fine grained, slightly moist to dry, med dense, 1" subrounded gravel. [Glacial Till]
	EVT-9803-401	SS		0.70	3.0 - 4.0'		
	EVT-9803-402	SS		0.80	4.0 - 5.0'		
5							
10							
15							
20							

GEOTECH EVI SPJ HYD-TUC.GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-16

Date Hole Started: 03/25/98 Date Hole Finished: 02/25/99

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: Former site of 515 Hawthorne St

Descriptive Location: In front yard adjacent to driveway

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Hole abandoned with Bentonite chips and 1' concrete cap with Aluminum ID Tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-408	SS		0.65	0.0 - 1.0'		0.0 - 3.0' Silty SAND Dark brown to orange brown, with orange mottling, moist to slight, medium to fine grained, trace red brick fragments at 0-2'; 1" and smaller subrounded gravel. [Smelter Debris]
	EVT-9803-409	SS		0.65	1.0 - 2.0'		
	EVT-9803-410	SS		0.60	2.0 - 3.0' Duplicate sample at 12:00, # 413.		
	EVT-9803-411	SS		0.60	3.0 - 4.0'		
5	EVT-9803-412	SS		0.80	4.0 - 5.0'		3.0 - 5.0' Silty SAND Gray-brown, with orange staining at 3', dry, dense, with 3" and smaller subrounded gravel. [Glacial Till]
10							
15							
20							

GEOTECH EVTSA-1 GPJ HYD-TUC GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-17

Date Hole Started: 03/25/98 Date Hole Finished: 03/25/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: Former site of 515 Hawthorne St

Descriptive Location: SE corner of yard

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
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Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

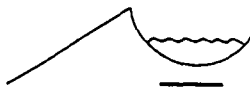
Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Hole abandoned with Bentonite chips and 1' concrete cap with Aluminum ID Tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-403	SS		0.60	0.0 - 1.0'		0.0 - 2.0' Silty LOAM/Sandy SILT Dark brown to yellow brown, trace orange mottling, slightly moist to moist, root mass, trace red brick fragments. [Smelter Debris]
	EVT-9803-404	SS		0.60	1.0 - 2.0'		
	EVT-9803-405	SS		0.50	2.0 - 3.0'		2.0 - 5.0' Silty SAND Light Brown grading to gray brown with some orange mottling; moist to slightly moist, medium to fine grained, medium dense, 3" and smaller subrounded gravel. [Glacial Till]
	EVT-9803-406	SS		0.50	3.0 - 4.0'		
	EVT-9803-407	SS		1.10	4.0 - 5.0'		
5							
10							
15							
20							

GEOTECH EVTS. PJ HYD-TUC.GDT 7/13/98



**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-18

Date Hole Started: 03/25/98 Date Hole Finished: 03/25/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: Former site of 505 Hawthorne St

Descriptive Location: 10' from NE corner of foundation

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

**WELL COMPLETION Y/N**

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

**DEVELOPMENT/SAMPLING**

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

**INTERVAL**

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Hole abandoned with Bentonite chips and 1' concrete cap with Aluminum ID Tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-420	SS		0.80	0.0 - 1.0'		0.0 - 1.0' Silty LOAM Dark brown, slightly moist, worms, root matter. (Fill)
	EVT-9803-421	SS		0.80	1.0 - 2.0'		1.0 - 3.0' Silty SAND Light brown mottled orange, fine to medium grained, medium dense to loose, trace 1/2" subrounded gravel. (Fill)
	EVT-9803-422	SS		0.75	2.0 - 3.0'		3.0 - 5.0' Sandy SILT Gray with some orange staining, dry, dense to hard, trace 1" subrounded gravel; 1" lense of coarse yellowish white and black sand at 4-5'. (Glacial Till)
	EVT-9803-423	SS		0.75	3.0 - 4.0'		
	EVT-9803-424	SS		0.60	4.0 - 5.0'		
5							
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-19

Date Hole Started: 03/30/98 Date Hole Finished: 03/30/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: R Leedy

Legal Description: 215 Medora Way

Descriptive Location: NW Front yard

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
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Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Hole abandoned with potting soil.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-453	SS		0.50	0.0 - 1.0'		0.0 - 2.0' Silty LOAM Brown, slightly moist, organic matter, trace gravel. [Fill]
	EVT-9803-454	SS		0.50	1.0 - 2.0'		2.0 - 5.0' Silty SAND Light brown to gray brown, with some orange staining, medium to fine grained, moist from 2-3' dry thereafter; medium dense to dense; Some 3" and smaller gravel, subrounded. [Glacial Till]
	EVT-9803-455	SS		0.70	2.0 - 3.0'		
	EVT-9803-457	SS		0.50	3.0 - 4.0'		
	EVT-9803-458	SS		0.60	4.0 - 5.0'		
5							
10							
15							
20							

GEOTECH EVTS  
PJ HYD-TUC GDI 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-20

Date Hole Started: 03/30/98 Date Hole Finished: 03/30/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: M Ryan

Legal Description: 207 Medora Way

Descriptive Location: Center of back yard

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Hole abandoned with potting soil.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-448	SS		0.50	0.0 - 1.0'		0.0 - 2.0' Silty LOAM Brown, moist to slightly moist, highly organic. [Fill]
	EVT-9803-449	SS		0.50	1.0 - 2.0'		
	EVT-9803-450	SS		0.70	2.0 - 3.0'		2.0 - 5.0' Sandy SILT Light brown to gray some orange mottling, medium dense to loose, slightly moist to dry. [Glacial Till]
	EVT-9803-451	SS		0.70	3.0 - 4.0'		
	EVT-9803-452	SS		1.00	4.0 - 5.0'		
5						5	
10						10	
15						15	
20						20	



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-21

Date Hole Started: 03/30/98 Date Hole Finished: 03/30/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: M Legg

Legal Description: Last house on Whitehorse Trail

Descriptive Location: 15' straight out from front door.

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
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Well Installed?	N		
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Surface Casing Used?	N		
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Screen/Perforations?	N		
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Sand Pack?	N		
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Annular Seal?	N		
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Surface Seal?	N		
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DEVELOPMENT/SAMPLING
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Well Developed?	N
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Water Samples Taken?	N
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Boring Samples Taken?	Y	Metals Analysis	1 ft.
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Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Hole abandoned with potting soil.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-444A	SS		0.60	0.0 - 1.0' Duplicate sample 447B @ 1445		0.0 - 2.0' Silty LOAM Brown, slightly moist, roots and organics, trace gravel. [Fill]
	EVT-9803-444B	SS		0.60	1.0 - 2.0'		
	EVT-9803-445	SS		0.70	2.0 - 3.0'		2.0 - 4.0' Gravelly Sandy SILT Light brown, slightly moist to moist, medium dense to loose, subrounded gravel, trace roots and trace red brick fragments. [Smelter Debris]
	EVT-9803-446	SS		0.70	3.0 - 4.0'		
	EVT-9803-447B	SS		0.60	4.0 - 5.0'		4.0 - 5.0' Silty SAND Light brown to orange brown with some orange staining, fine grained to silt, moist to slightly moist, medium dense to loose grained. [Glacial Till]
5							
10							
15							
20							

GEOTECH EVTS  
J HYD-TUC-GOT 7/13/98



**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-22

Date Hole Started: 04/08/98 Date Hole Finished: 04/08/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: City of Everett

Legal Description: Medora Way

Descriptive Location: Middle of Medora Way in front of 215.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

**WELL COMPLETION Y/N DESCRIPTION INTERVAL**

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

**DEVELOPMENT/SAMPLING**

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Hole abandoned with Potting soil. Bentonite chips and 1' concrete cap with an Aluminum ID Tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9804-306	SS		0.65	0.0 - 1.0'		0.0 - 0.5' Asphalt
	EVT-9804-307	SS		0.65	1.0 - 2.0'		Asphalt black [Road Pavement]
	EVT-9804-308	SS		1.00	2.0 - 3.0'		0.5 - 2.0' SAND & GRAVEL
	EVT-9804-309	SS		1.00	3.0 - 4.0'		Dark brown, medium to fine grained, dry; Gravel is 2" and smaller, angular. [Road Base Fill]
5	EVT-9804-310	SS		1.00	4.0 - 5.0' Duplicate sample at 09:30 #311		2.0 - 4.0' Sandy SILT
							Light brown to gray, moist to slightly moist, abundant 1" subangular gravel. [Road Base Fill]
							4.0 - 5.0' Gravelly SILT
							Light brown mottled orange, moist, approximately 30-40% 2" and smaller subrounded gravel. [Glacial Till]
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-23

Date Hole Started: 04/08/98 Date Hole Finished: 04/08/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: State of Washington

Legal Description: SR 529 median

Descriptive Location: Median from SR529 South to E Marine View Dr. northbound.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
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Well Installed?	N		
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Surface Casing Used?	N		
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Screen/Perforations?	N		
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Sand Pack?	N		
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Annular Seal?	N		
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Surface Seal?	N		
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DEVELOPMENT/SAMPLING
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Well Developed?	N
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Water Samples Taken?	N
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Boring Samples Taken?	Y	Metals Analysis	1 ft.
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Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-425	SS		0.70	0.0 - 1.0'		0.0 - 0.7' Silty LOAM Dark brown, moist, with root mat.
	EVT-9803-426	SS		0.70	1.0 - 2.0'		(Fill) 0.7 - 5.0' Silty SAND
	EVT-9803-427	SS		0.75	2.0 - 3.0'		Gray to gray brown with some orange mottling, medium to fine grained, medium dense to dense, slightly moist to dry, with some 1" subrounded gravel.
	EVT-9803-428	SS		0.75	3.0 - 4.0'		(Glacial Till)
5	EVT-9803-429	SS		1.00	4.0 - 5.0' Duplicate sample taken at 08:55 EVT-9803-430		
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-24

Date Hole Started: 04/01/98 Date Hole Finished: 04/01/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: City of Everett

Legal Description: E Marine View Dr.

Descriptive Location: Just past SR529 Northbound in left turn lane.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "N" rod under a 300 lb, 30" drop safety hammer on a winch release on an Mobile Drill B-61. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb).

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9804-300	SS		0.50	0.0 - 1.0'		0.0 - 1.0' ASPHALT & GRAVEL Black asphalt and 1/2" angular gravel. (Road Pavement)
	EVT-9804-301	SS		0.50	1.0 - 2.0'		1.0 - 2.0' Gravelly SAND Light brown, medium grained, dry, dense to medium dense; 40% 1/2" subround gravel. (Road Base Fill)
	EVT-9804-302	SS		1.00	2.0 - 3.0'		2.0 - 5.0' Sandy SILT Light brown with some oxidation staining at 4-5'; dry, dense to hard; S is medium to fine grained; Some 2" and smaller subrounded gravel. (Glacial Till)
	EVT-9804-303	SS		1.00	3.0 - 4.0'		
	EVT-9804-304	SS		1.00	4.0 - 5.0'		
5							
10							
15							
20							



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-25

Date Hole Started: 03/18/98 Date Hole Finished: 03/18/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: City of Everett

Legal Description: Alley between Pilchuck Path and E Mar. Vw

Descriptive Location: In alley behind 535 Pilchuck Path Garage

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-315	SS		0.50	0.0 - 1.0'		0.0 - 0.5' Asphalt Black asphalt (Road Pavement)
	EVT-9803-316	SS		0.50	1.0 - 2.0'		0.5 - 2.0' Gravelly SAND Gray, dry, medium to coarse grained, loose; 2" and smaller subrounded gravel. (Road Base Fill)
	EVT-9803-317	SS		0.70	2.0 - 3.0'		2.0 - 5.0' Silty SAND Orange brown to light brown, medium to fine grained, slightly moist to dry, trace organic matter. 2" and smaller subangular gravel. (Road Base Fill)
	EVT-9803-318	SS		0.70	3.0 - 4.0' Duplicate sample @ 1705, EVT-9803-319		
	EVT-9803-320	SS		0.80	4.0 - 5.0'		
5							
10							
15							
20							

GEOTECH EVTS. PJ HYD TUC.GDT 7/13/98



**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Soil Boring Log

Hole Name: SA-26

Date Hole Started: 03/19/98 Date Hole Finished: 03/19/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: City of Everett

Legal Description: Pilchuck Path

Descriptive Location: In front of 530 Pilchuck Path

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Split Spoon

Drilling Fluids Used: None

Purpose of Hole: Source Area Investigation

Target Aquifer: N/A

Hole Diameter (in): 3.0

Total Depth Drilled (ft): 5

**WELL COMPLETION Y/N DESCRIPTION INTERVAL**

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

**DEVELOPMENT/SAMPLING**

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring sampled with 3" (OD) split spoon on "A" rod under a 140 lb, 30" drop safety hammer on a cat head on an Acker Drill mounted on a Bobcat. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-321	SS		0.20	0.0 - 1.0'		0.0 - 0.5' ASPHALT Black Asphalt; Difficult drilling. (Road Pavement)
	EVT-9803-322	SS		0.20	1.0 - 2.0'		0.5 - 2.0' Gravelly SAND Dark gray, medium to coarse grained, slightly moist to dry; approxima 20-30% 1/4" subrounded gravel. (Road Base Fill)
	EVT-9803-323	SS		0.70	2.0 - 3.0'		2.0 - 5.0' Gravelly Sandy SILT Light brown to orange brown with trace orange mottling, slightly moist medium dense, gets sandier with depth; some 2" and smaller subrou gravel. (Road Base Fill)
	EVT-9803-324	SS		0.70	3.0 - 4.0'		
	EVT-9803-325A	SS		1.00	4.0 - 5.0'		
5							
10							
15							
20							

GEOTECH EVTSA-1.GPJ HYD-TUC.GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-3

Date Hole Started: 03/20/98 Date Hole Finished: 03/23/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 415 Pilchuck Path

Descriptive Location: Back Yard (Former roaster area)

Recorded By: J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: JN/RY

Drilling Method: Hollow Stem Auger/Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): 3.5

Total Depth Drilled (ft): 11

WELL COMPLETION Y/N

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

INTERVAL

1 ft. to 6'; 2' thereafter

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe; Continued drilling from 5' to 11' with Piper 2000 2 1/4" (ID) HSA, sampled with a 2" split spoon using "A" rod, a 140 lb. 30 inch drop safety hammer on a cat head. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied while test pit borings were abandoned with bentonite chips and a one foot concrete cap with an aluminium ID tag. Test pits also were topped with a concrete patch and aluminum ID tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-169	GRAB			0.0 - 1.0'		0.0 - 1.0' Silty LOAM Brown, slightly moist to dry. [Fill]
	EVT-9803-170	GRAB			1.0 - 2.0' Complete flue structure, see field book for sketches.		1.0 - 2.0' Silty SAND Brown, medium to fine grained, slightly moist to dry, some 1/2" subrounded gravel. Abundant red brick fragments. [Smelter Debris]
	EVT-9803-171	GRAB			2.0 - 3.0'		2.0 - 3.0' Gravelly SAND Yellow to white, medium grained, slightly moist to dry, 20-30% 1" subrounded gravel with abundant red brick debris. [Smelter Debris]
	EVT-9803-172	GRAB			3.0 - 4.0'		3.0 - 4.0' Gravelly SAND Same as above no brick or gravel. [Smelter Debris]
5	EVT-9803-173	GRAB			4.0 - 5.0'		4.0 - 7.0' BRICK red, crumbled w/ white-gray, sandsized particles (mortar), dry. [Smelter Debris]
	EVT-9803-174	GRAB			5.0 - 6.0' Duplicate SS (blow count 5/8) sample for TPB-3 @ 5-6' on 3/23 @ 13:15 #175.		7.0 - 8.0' SILT Light brown to gray brown, dry, stiff; trace medium to coarse sand w/ fine subrounded gravel. [Glacial Till]
	EVT-9803-176	SS	12/33	0.75	6.0 - 7.0'		8.0 - 9.0' SAND & SILT 4" of medium grained, gray, slightly moist sand; 4" to gray-brown, slightly moist to dry, very stiff to hard silt; trace gravel. [Glacial Till]
	EVT-9803-177	SS	26/43	0.75	7.0 - 8.0'		9.0 - 11.0' Slightly Silty SAND Brown-gray, moist, medium to fine grained, medium dense, trace gravel. [Glacial Till]
	EVT-9803-178	SS	87/50-4	0.75	8.0 - 9.0'		
	EVT-9803-179	SS	27/24	0.70	9.0 - 10.0'		
10	EVT-9803-180	SS	56/60	0.70	10.0 - 11.0' Duplicate sample @ 13:45; EVT-9803-181		

GEOTECH EVISA J HYD TUC GDI 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-4

Date Hole Started: 03/18/98 Date Hole Finished: 04/

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 525 Pilchuck Path

Descriptive Location: Front Yard (Former As kitchens)

Recorded By: B Thompson/J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: JN/RV

Drilling Method: Hollow Stem Auger/Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): 3.5

Total Depth Drilled (ft): 11

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft. to 7'; 2' thereafter

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe; Continued drilling from 5' to 11' with Piper 2000 2 1/4" (ID) HSA, sampled with a 2" split spoon using "A" rod, a 140 lb. 30 inch drop safety hammer on a cat head. Samples submitted to Hydrometrics Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied while test pit borings were abandoned with bentonite chips and a one foot concrete cap with an aluminium ID tag. Test pits also were topped with a concrete patch and aluminum ID tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-112	GRAB			0.0 - 1.0'		0.0 - 1.0' Sandy LOAM
	EVT-9803-113	GRAB			1.0 - 2.0'		Dark Brown (Fill)
	EVT-9803-114	GRAB			2.0 - 3.0'		1.0 - 2.5' Gravelly SILT
	EVT-9803-115	GRAB			3.0 - 4.0'		Brown, gravel well rounded to 2"; Occasional brick debris. (Smelter Debris)
	EVT-9803-116	GRAB			4.0 - 5.0'		2.5 - 3.5' SILT
5	EVT-9803-117	GRAB			5.0 - 6.0' Duplicate EVT-9803-118 @ 12:12; 2nd Duplicate @ 15:00 4/7/98 at TPB-4 EVT-9804-120 (blow count, 12/18, 6' recovered, 6.0 - 7.0'	5	Dark brown, and abundant brick debris, discontinuous lenses of me sand (very limited in extent). (Smelter Debris)
	EVT-9804-121	SS	15/31	1.00	6.0 - 7.0'		3.5 - 4.5' SAND
							1-2" of sand underlain by orange to light brown silt and fine sand with trace fine gravel. (Fill)
	EVT-9804-122	SS	13/35	1.00	8.0 - 9.0'		4.5 - 6.0' SAND & SILT
							Transition to light brown/gray, silt and sand, moist becomes drier at 6'. (Glacial Till)
10	EVT-9804-123	SS	15/20	1.00	10.0 - 11.0'	10	6.0 - 11.0' Sandy SILT
							Light brown to gray mottled orange, dry, medium dense to loose, trace fine gravel. (Glacial Till)
15						15	
20						20	

GEOTECH EVTSA-1.GPJ HYD-TUC.GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-5

Date Hole Started: 03/19/98 Date Hole Finished: 03/19/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 525 Pilchuck Path

Descriptive Location: Back Yard (Former roaster area)

Recorded By: B Thompson

Drilling Company: Hydrometrics, Inc.

Driller: R Yeager

Drilling Method: Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): 3x31"

Total Depth Drilled (ft): 5

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
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Well Installed?	N		
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Surface Casing Used?	N		
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Screen/Perforations?	N		
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Sand Pack?	N		
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Annular Seal?	N		
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Surface Seal?	N		
---------------	---	--	--

DEVELOPMENT/SAMPLING

Well Developed?	N		
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Water Samples Taken?	N		
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Boring Samples Taken?	Y	Metals Analysis	1 ft.
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Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 5', grab samples collected with a hand trowel and hoe. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied. A one foot concrete cap with an aluminium ID tag was placed at the sample locations.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-126	GRAB			0.0 - 1.0'		0.0 - 1.0' Sandy LOAM Brown, little fine well rounded gravel. [Fill]
	EVT-9803-127	GRAB			1.0 - 2.0' Duplicate sample at 08:50 EVT-9803-131		1.0 - 2.0' SAND Gray/Brown sandy interval with abundant red brick fragments, some white mortling. [Smelter Debris]
	EVT-9803-128	GRAB			2.0 - 3.0'		2.0 - 3.0' Gravelly SILT & SAND Orange/brown, transitioning into light brown silt and sand with trace gravel. [Fill]
	EVT-9803-129	GRAB			3.0 - 4.0'		3.0 - 5.0' SILT & SAND Light brown/gray silt & fine sand, with trace of fine gravel, moist (no free water) drier at 4-5' and very dense.. [Glacial Till]
	EVT-9803-130	GRAB			4.0 - 5.0'		



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-6A

Date Hole Started: 03/18/98 Date Hole Finished: 04/07/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 521 Pilchuck Path

Descriptive Location: North side of front yard. (As Kitchens)

Recorded By: B Thompson/J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: JN/RY

Drilling Method: Hollow Stem Auger/Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): TPB 3.5"; TP 3x12"

Total Depth Drilled (ft): 13

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft. to 7'; 2' thereafter

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe; Continued drilling from 5' to 11' with Piper 2000 2 1/4" (ID) HSA, sampled with a 2" split spoon using "A" rod, a 140 lb. 30 inch drop safety hammer on a cat head. Samples submitted to Hydrometric Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied while test pit borings were abandoned with bentonite chips and a one foot concrete cap with an aluminium ID tag. Test pits also were topped with a concrete patch and aluminum ID tag. Borings adjacent to test pits were labeled TPB (test pit number).

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-106	GRAB			0.0 - 1.0'		0.0 - 1.0' Silty LOAM
	EVT-9803-107	GRAB			1.0 - 2.0'		Brown, trace gravel to 1' well rounded brick fragments. (Smelter Debris)
	EVT-9803-108	GRAB			2.0 - 3.0'		1.0 - 2.0' BRICK
	EVT-9803-109	GRAB			3.0 - 4.0'		Brown sandy SILT overlying brick layer consisting of three rows of red mortared brick; approximately two 1/2" gray sand underlying brick. (Smelter Debris)
	EVT-9803-110	GRAB			4.0 - 5.0'		2.0 - 4.0' Silty SAND
5	EVT-9803-111	GRAB			5.0 - 6.0' A sample from 5-6' was also obtained at time of drilling TPB; EVT-9804-115 @ 1140 on 04/07/98	5	Orange/brown silty sand some brown to black mottling; black charcoal fragments; trace gravel. (Fill)
	EVT-9804-116	SS	7/25	0.70	6.0 - 7.0'		4.0 - 6.0' SILT & SAND
							Light brown silt and sand, trace gravel well rounded. (Glacial Till)
	EVT-9804-117	SS	15/22	0.70	8.0 - 9.0'		6.0 - 12.0' Sandy SILT
							Light brown to gray mottled orange, dry, medium dense, trace fine gravel (Glacial Till)
10	EVT-9804-118	SS	10/30	0.60	10.0 - 11.0'	10	
	EVT-9804-119	SS	30/50-5	0.70	12.0 - 13.0'		12.0 - 13.0' SILT
							Light brown to gray, dry, dense, trace fine gravel. (Glacial Till)
15						15	
20						20	

GEOTECH EVTSA-1.GPJ HYD-TUC.GDT 8/5/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-6B

Date Hole Started: 03/18/98 Date Hole Finished: 03/18/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 521 Pilchuck Path

Descriptive Location: South side of front yard.

Recorded By: B Thompson

Drilling Company: Hydrometrics, Inc.

Driller: R Yeager

Drilling Method: Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): 3x7.5'

Total Depth Drilled (ft): 6

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
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Well Installed?	N		
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Surface Casing Used?	N		
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Screen/Perforations?	N		
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Sand Pack?	N		
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Annular Seal?	N		
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Surface Seal?	N		
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DEVELOPMENT/SAMPLING

Well Developed?	N		
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Water Samples Taken?	N		
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Boring Samples Taken?	Y	Metals Analysis	1 ft.
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Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 5', grab samples collected with a hand trowel and hoe. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied. A one foot concrete cap with an aluminium ID tag was placed at the sample locations.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-100	GRAB			0.0 - 1.0'		0.0 - 1.0' Silty LOAM Brown silty loam with trace of fine gravel. Abundant brick fragments. [Fill]
	EVT-9803-101	GRAB			1.0 - 2.0'		1.0 - 2.0' BRICK Brick floor intact at 1.5'; 0.2' dark brown silty sand over orange brick 0.2' medium sand under brick underlain by orange/brown silty sand with trace clay, some gravel and cobbles to 2'. [Smelter Debris]
5	EVT-9803-102	GRAB			2.0 - 3.0'		2.0 - 4.0' Silty SAND Orange brown silty sand some gravel trace clay; some dark brown to black mottling in soil for 1' below brick layer, wood debris in darker areas [Fill]
	EVT-9803-103	GRAB			3.0 - 4.0'		4.0 - 6.0' SILT & SAND Transition to light gray/brown silt to fine sand, trace gravel & cobbles, some orange to gray mottling; very dense. [Glacial Till]
	EVT-9803-104	GRAB			4.0 - 5.0'		
	EVT-9803-105	GRAB			5.0 - 6.0'		
10							
15							
20							

GEOTECH EVTSA-10PJ HYD-TUC.GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-7

Date Hole Started: 03/19/98 Date Hole Finished: 04/07/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 515 Pilchuck Path

Descriptive Location: Back yard (Former As dust chambers)

Recorded By: B Thompson/J Swortz

Drilling Company: Hydrometrics, Inc.

Driller: JN/RV

Drilling Method: Hollow Stem Auger/Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): TPB 3.5"; TP 3x47"

Total Depth Drilled (ft): 11

WELL COMPLETION Y/N

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

INTERVAL

1 ft. to 7'; 2' thereafter

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe; Continued drilling from 5' to 11' with Piper 2000 2 1/4" (ID) HSA, sampled with a 2" split spoon using "A" rod, a 140 lb. 30 inch drop safety hammer on a cat head. Samples submitted to Hydrometric Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied while test pit borings were abandoned with bentonite chips and a one foot concrete cap with an aluminium ID tag. Test pits also were topped with a concrete patch and aluminum ID tag. Borings adjacent to test pits were labeled TPB-[test pit number].

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-132	GRAB			0.0 - 1.0'		0.0 - 1.0' Sandy LOAM Brown Sandy LOAM [Fill]
	EVT-9803-133	GRAB			1.0 - 2.0'		1.0 - 2.0' Silty SAND Brown loam radinf into silty sand and gravel with traced of red bnck fragments, some black mottling. [Smelter Debris]
	EVT-9803-134	GRAB			2.0 - 3.0'		2.0 - 3.0' Silty SAND & GRAVEL Gray silty fine sand and gravel with yellowish staining and trace red b fragments. [Smelter Debris]
	EVT-9803-135	GRAB			3.0 - 4.0'		3.0 - 5.0' Silty SAND and GRAVEL Orange Silty SAND grading to orange/brown to light brown Silty SANI and GRAVEL. [Fill]
	EVT-9803-136	GRAB			4.0 - 5.0'		5.0 - 7.5' Silty SAND Light brown to gray with some orange mottling, fine to very fine grain mosit, med dense, trace fine gravels. [Glacial Till]
	EVT-9803-137	GRAB			5.0 - 6.0'		7.5 - 11.0' Silty SAND Light brown, fine grained, loose to medium dense, moist. [Glacial Till]
	EVT-9804-106	SS	14/21	1.00	6.0 - 7.0'		
	EVT-9804-107	SS	8/10	1.00	8.0 - 9.0'		
	EVT-9804-108	SS	12/26	0.75	10.0 - 11.0'		

TP-7

8-9'

HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

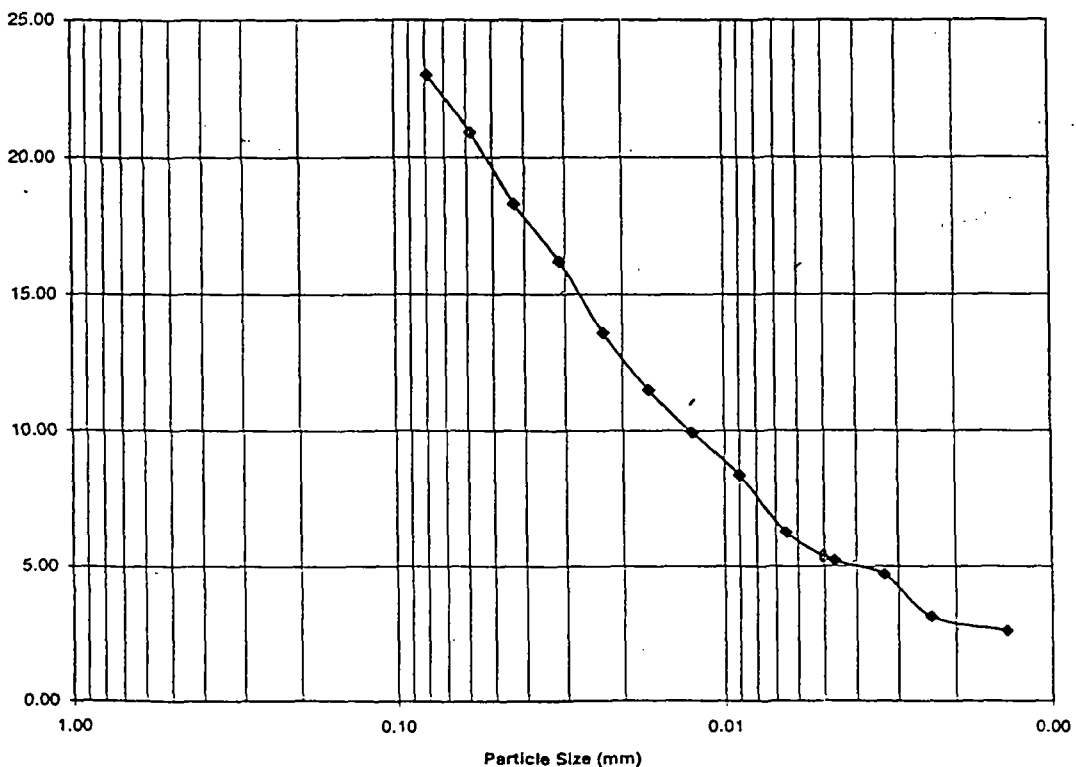
# HYDROMETER ANALYSIS

LABORATORY NUMBER  
SAMPLE NUMBER  
DATE  
ANALYST

98R-01159  
EVT-9803-107  
6/29/98  
SM

Time	Reading	Rcp	% Finer	Rcl	L	A	D	% Finer of Total
0.25	49	44	88.00	50	8.3	0.0137	0.08	22.99
0.5	45	40	80.00	46	9	0.0137	0.06	20.90
1	40	35	70.00	41	9.8	0.0137	0.04	18.29
2	36	31	62.00	37	10.4	0.0137	0.03	16.20
4	31	26	52.00	32	11.2	0.0137	0.02	13.59
8	27	22	44.00	28	11.9	0.0137	0.02	11.50
15	24	19	38.00	25	12.4	0.0137	0.01	9.93
30	21	16	32.00	22	12.9	0.0137	0.01	8.36
60	17	12	24.00	18	13.5	0.0137	0.01	6.27
120	15	10	20.00	16	13.8	0.0137	0.00	5.23
240	14	9	18.00	15	14	0.0137	0.00	4.70
480	11	6	12	12	14.5	0.0137	0.00	3.14
1440	10	5	10	11	14.7	0.0137	0.00	2.61

Hydrometer Particle Size Distribution



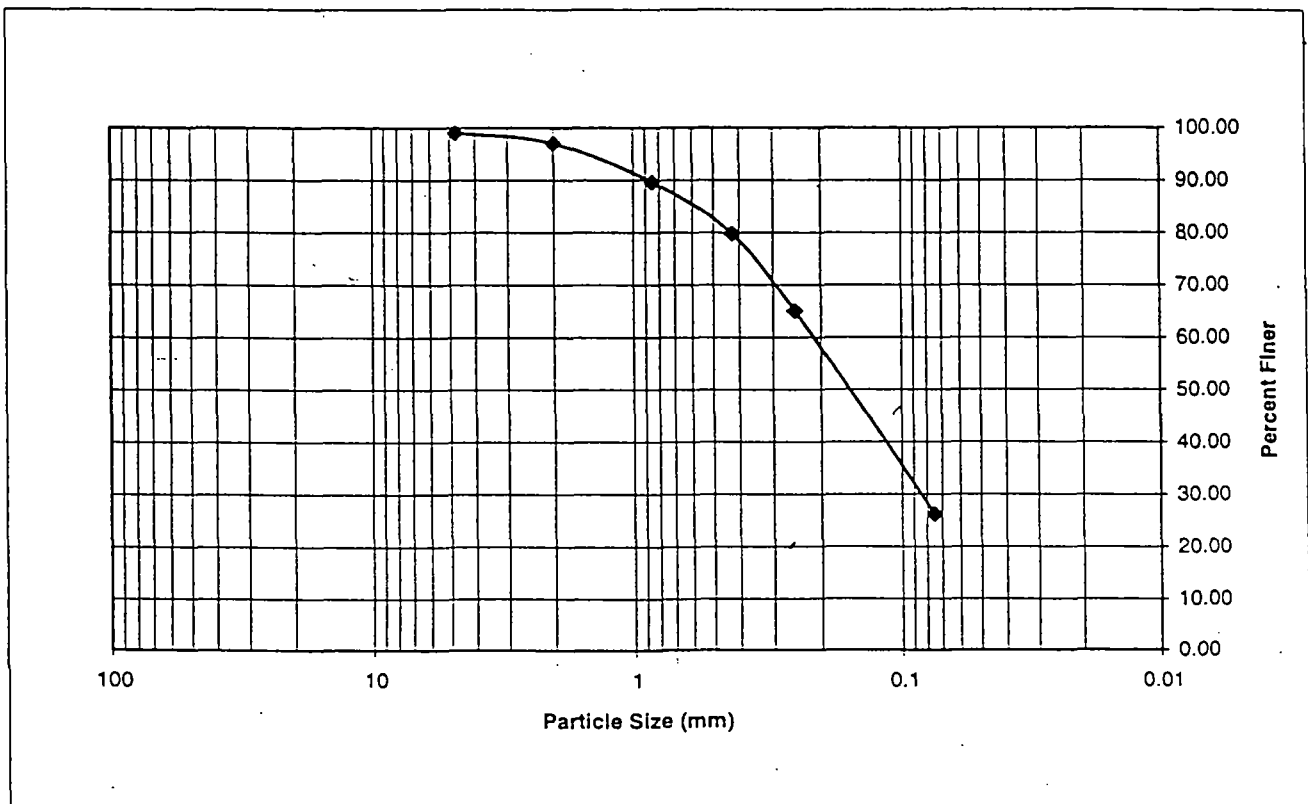
HYDROMETRICS, INC.  
 RUSTON LABORATORY  
 5227 NORTH 49TH STREET  
 RUSTON, WASHINGTON 98407

Laboratory Number: 98R-01159  
 Sample Number: EVT-9803-107  
 Date: 6/25/98

Weight of Oven Dry Sample (g): 255.3

Sieve Number	Sieve Opening (mm)	Weight Retained			
4	4.75	2.5	0.98	0.98	99.02
10	2.00	5.00	1.96	2.94	97.06
20	0.85	19.00	7.44	10.38	89.62
40	0.425	25.20	9.87	20.25	79.75
60	0.250	37.60	14.73	34.98	65.02
200	0.075	99.30	38.90	73.87	26.13
PAN	< 0.075	67.10	26.28		

sum = 255.7



TP-7  
10-11'

HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

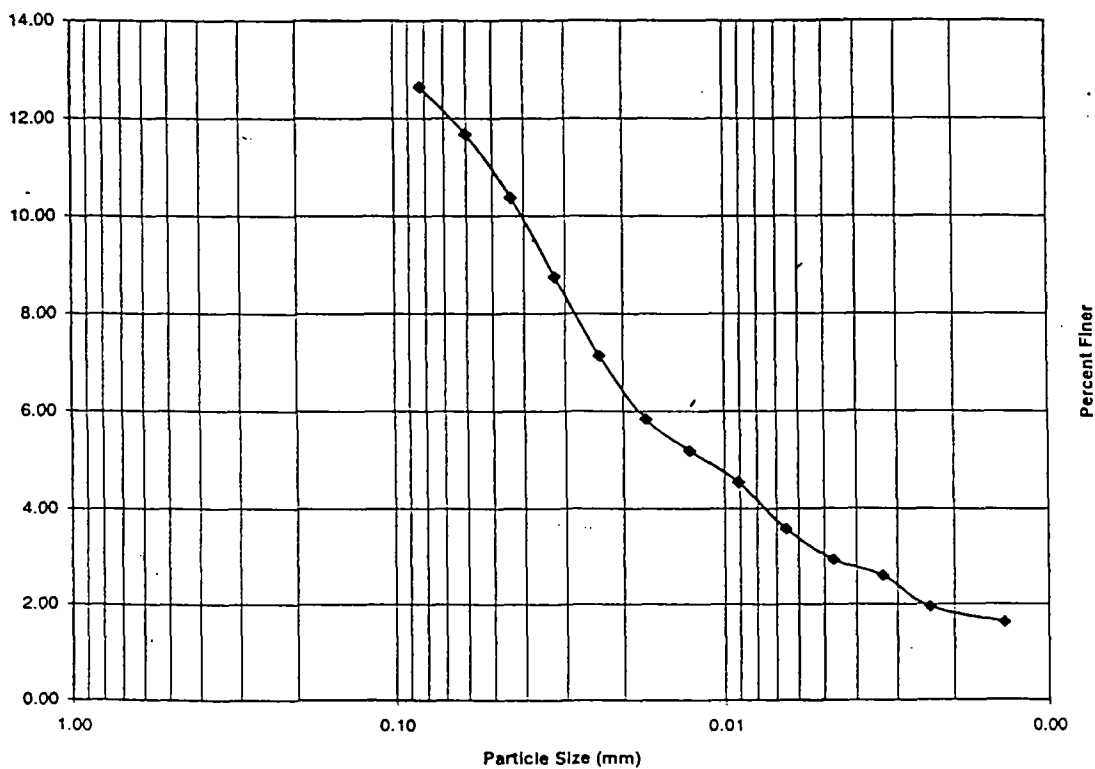
# HYDROMETER ANALYSIS

LABORATORY NUMBER  
SAMPLE NUMBER  
DATE  
ANALYST

98R-01160  
EVT-9804-108  
6/29/98  
SM

Time	Reading	Rcp	% Finer	Rcl	L	A	D	% Finer of Total
0.25	44	39	84.23	45	9.1	0.0137	0.08	12.64
0.5	41	36	77.75	42	9.6	0.0137	0.06	11.67
1	37	32	69.11	38	10.2	0.0137	0.04	10.37
2	32	27	58.32	33	11.1	0.0137	0.03	8.75
4	27	22	47.52	28	11.8	0.0137	0.02	7.13
8	23	18	38.88	24	12.5	0.0137	0.02	5.84
15	21	16	34.56	22	12.9	0.0137	0.01	5.19
30	19	14	30.24	20	13.2	0.0137	0.01	4.54
60	16	11	23.76	17	13.7	0.0137	0.01	3.57
120	14	9	19.44	15	14	0.0137	0.00	2.92
240	13	8	17.28	14	14.2	0.0137	0.00	2.59
480	11	6	12.96	12	14.5	0.0137	0.00	1.95
1440	10	5	10.80	11	14.7	0.0137	0.00	1.62

Hydrometer Particle Size Distribution



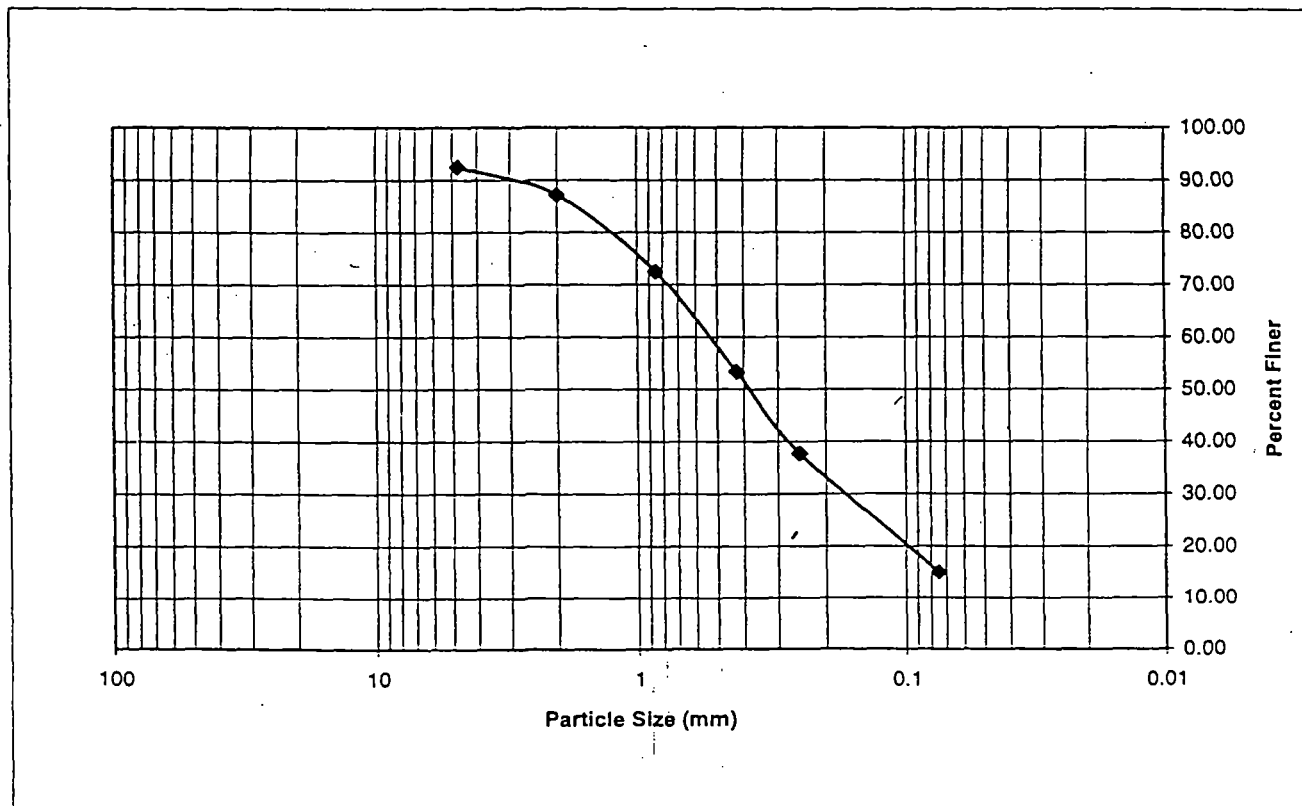
HYDROMETRICS, INC.  
 RUSTON LABORATORY  
 5227 NORTH 49TH STREET  
 RUSTON, WASHINGTON 98407

Laboratory Number: 98R-01160  
 Sample Number: EVT-9804-108  
 Date: 6/26/98

Weight of Oven Dry Sample (g): 287.8

<u>Sieve Number</u>	<u>Sieve Opening (mm)</u>	<u>Weight Retained</u>			
4	4.75	21.5	7.47	7.47	92.53
10	2.00	15.40	5.35	12.82	87.18
20	0.85	42.10	14.63	27.45	72.55
40	0.425	55.30	19.21	46.66	53.34
60	0.250	45.10	15.67	62.33	37.67
200	0.075	65.20	22.65	84.99	15.01
PAN	< 0.075	43.70	15.18		

sum = 288.3





# HYDROMETRICS INC.

Consulting Scientists and Engineers'  
Tacoma, Washington

Evaluate structures

Hole Name: TP-8

Date Hole Started: 03/19/98 Date Hole Finished: 03/19/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 503 Pilchuck Path

Descriptive Location: SE back yard (Former dust chamber area)

Recorded By: JSwartz

Drilling Company: Hydrometrics, Inc.

Driller: R Yeager

Drilling Method: Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): 3x22'

Total Depth Drilled (ft): 6

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
-----------------	-----	-------------	----------

Well Installed?	N		
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Surface Casing Used?	N		
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Screen/Perforations?	N		
----------------------	---	--	--

Sand Pack?	N		
------------	---	--	--

Annular Seal?	N		
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Surface Seal?	N		
---------------	---	--	--

DEVELOPMENT/SAMPLING
----------------------

Well Developed?	N
-----------------	---

Water Samples Taken?	N
----------------------	---

Boring Samples Taken?	Y	Metals Analysis	1 ft.
-----------------------	---	-----------------	-------

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied. A one foot concrete cap with an aluminium ID tag was placed at the sample locations.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-138	GRAB			0.0 - 1.0'		0.0 - 2.0' Sandy LOAM Brown, trace 1/2" subrounded gravel and red brick fragments. (Smelter Debris)
	EVT-9803-139	GRAB			1.0 - 2.0' Duplicate sample at 13:52, EVT-9803-144		
	EVT-9803-140	GRAB			2.0 - 3.0'		2.0 - 4.0' Gravelly Silty SAND Yellow-brown to gray some black staining at 2-3', slightly moist, medium to fine grained; approximately 10-20% 2" and smaller subrounded gravel; abundant brick fragments. (Smelter Debris)
	EVT-9803-141	GRAB			3.0 - 4.0'		
	EVT-9803-142	GRAB			4.0 - 5.0'		4.0 - 5.0' Sandy SILT Yellow brown with some orange mottling, moist, fine to coarse sand, trace rounded 1/4" gravel. (Fill)
	EVT-9803-143	GRAB			5.0 - 6.0'		5.0 - 6.0' Gravelly SAND Light gray, medium grained, slightly moist to dry, <10% subrounded gravel. (Glacial Till)



**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

**Hole Name: TP-9**

Date Hole Started: 03/18/98 Date Hole Finished: 03/18/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 3010 5th St

Descriptive Location: Front Yard (former As dust chambers)

Recorded By: B Thompson

Drilling Company: Hydrometrics, Inc.

Driller: R Yeager

Drilling Method: Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): 3x22'

Total Depth Drilled (ft): 6

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied. A one foot concrete cap with an aluminium ID tag was placed at the sample locations.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-119	GRAB			0.0 - 1.0'		0.0 - 1.0' <b>Sandy LOAM</b> brown, sandy loam, some fine gravel and red brick fragments. (Fill)
	EVT-9803-120	GRAB			1.0 - 2.0' Duplicate sample EVT-9803-125		1.0 - 3.0' <b>Silty GRAVEL</b> 2 in gray, medium sand underlain by light brown to gray to black m... silty gravel. Gravel to 2" and well rounded; Black wood fragments. (Fill)
	EVT-9803-121	GRAB			2.0 - 3.0'		3.0 - 5.0' <b>Silty SAND &amp; GRAVEL</b> Orange/brown silty sand & gravel; transitioning to light gray/ brown and sand with traced fine gravel; very minor weep @ 5'. (Fill)
5	EVT-9803-122	GRAB			3.0 - 4.0'		5.0 - 6.0' <b>SILT &amp; SAND</b> Light brown/ gray silt and fine sand, trace fine gravel, becoming very dense and dry @ 6'. (ti)
	EVT-9803-123	GRAB			4.0 - 5.0'		
	EVT-9803-124	GRAB			5.0 - 6.0'		
10							
15							
20							

GEOTECH EVTSA-1.GPJ HYD-TUC.GDT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-10A

Date Hole Started: 03/20/98 Date Hole Finished: 03/20/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 511 Hawthorne

Descriptive Location: SW back yard (former Stack area)

Recorded By: JSwartz

Drilling Company: Hydrometrics, Inc.

Driller: R Yeager

Drilling Method: Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): 3x25"

Total Depth Drilled (ft): 6

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied. A one foot concrete cap with an aluminium ID tag was placed at the sample locations.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-163	GRAB			0.0 - 1.0'		0.0 - 1.0' Silty LOAM Brown, slightly moist to dry. (Fill)
	EVT-9803-164	GRAB			1.0 - 2.0'		1.0 - 4.0' Silty SAND Gray brown, slightly moist, medium to fine grained (becomes finer with depth), red brick fragments. (Smelter Debris)
	EVT-9803-165	GRAB			2.0 - 3.0'		
	EVT-9803-166	GRAB			3.0 - 4.0'		
	EVT-9803-167	GRAB			4.0 - 5.0'		4.0 - 5.0' Sandy SILT Light brown mottled black, slightly moist, red brick fragments (blue floor) some 1" rounded gravel. (Smelter Debris)
	EVT-9803-168	GRAB			5.0 - 6.0'		5.0 - 6.0' Sandy SILT Light brown moist slightly plastic, trace 1/4" and smaller gravel. (Fill)

GEOTECH EVTS. - PJ HYD-TUC-GOT 7/13/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-10B

Date Hole Started: 03/20/98 Date Hole Finished: 04/01/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 511 Hawthorne

Descriptive Location: SW back yard (former Stack area)

Recorded By: JSwartz

Drilling Company: Hydrometrics, Inc.

Driller: JN/RV

Drilling Method: Hollow Stem Auger/Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): TPB 3.5"; TP 3x25'

Total Depth Drilled (ft): 11'

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft. to 7'; 2' thereafter

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe; Continued drilling from 5' to 11' with Piper 2000 2 1/4" (ID) HSA, sampled with a 2" split spoon using "A" rod, a 140 lb. 30 inch drop safety hammer on a cat head. Samples submitted to Hydrometric Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied while test pit borings were abandoned with bentonite chips and a one foot concrete cap with an aluminium ID tag. Test pits also were topped with a concrete patch and aluminum ID tag. Borings adjacent to test pits were labeled TPB-[test pit number].

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-156	GRAB			0.0 - 1.0' Duplicate sample at 08:52, EVT-9803-162		0.0 - 5.0' Silty SAND Dark brown to yellow gray, medium to fine grained, slightly moist red brick fragments (2" from 1-2'). [Smelter Debris]
	EVT-9803-157	GRAB			1.0 - 2.0'		
	EVT-9803-158	GRAB			2.0 - 3.0'		
	EVT-9803-159	GRAB			3.0 - 4.0'		
	EVT-9803-160	GRAB			4.0 - 5.0'		
5	EVT-9803-161	GRAB			5.0 - 6.0' Duplicate sample during drilling EVT-9804-100 @ 14:20; Split spoon 15/47.		5.0 - 6.0' SILT Yellow brown slightly moist to dry, wood fragments, trace red brick frags some medium to coarse sand in a 1" lense. [Smelter Debris]
	EVT-9804-101	SS	25/44	0.80	6.0 - 7.0'		
	EVT-9804-102	SS	29/70	0.70	8.0 - 9.0'		6.0 - 11.0' Silty SAND Brown to gray, fine grained, dry, medium dense to very dense, trace 1/4" subrounded gravel. [Glacial Till]
10	EVT-9804-103	SS	49/82	0.80	10.0 - 11.0' Duplicate sample @ 14:40, EVT-9804-104.		
15							
20							

GEOTECH EVTSA-1 GPJ HYD-TUC-GDT 8/5/98

TP-10B

8-9'

HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

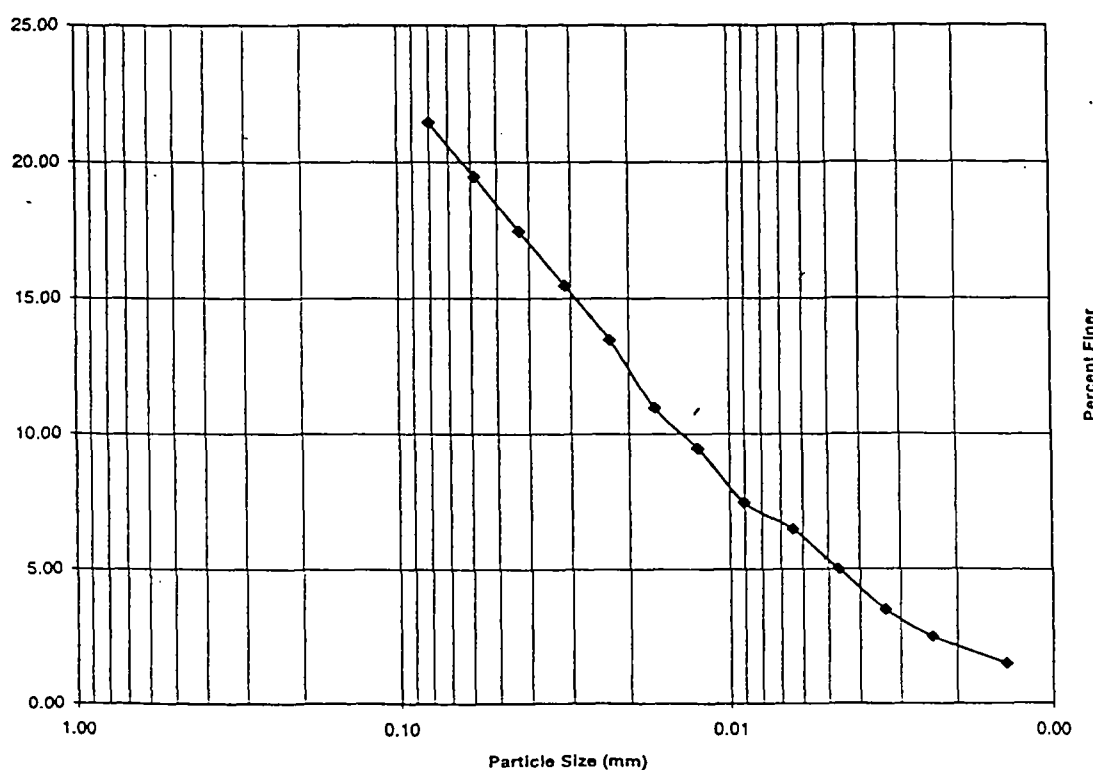
## HYDROMETER ANALYSIS

LABORATORY NUMBER  
SAMPLE NUMBER  
DATE  
ANALYST

98R-01154  
EVT-9804-102  
6/29/98  
SM

Time	Reading	Rcp	% Finer	Rcl	L	A	D	% Finer of Total
0.25	48	43	86.00	49	8.5	0.0137	0.08	21.45
0.5	44	39	78.00	45	9.1	0.0137	0.06	19.45
1	40	35	70.00	41	9.8	0.0137	0.04	17.46
2	36	31	62.00	37	10.4	0.0137	0.03	15.46
4	32	27	54.00	33	11.1	0.0137	0.02	13.47
8	27	22	44.00	28	11.9	0.0137	0.02	10.97
15	24	19	38.00	25	12.4	0.0137	0.01	9.48
30	20	15	30.00	21	13	0.0137	0.01	7.48
60	18	13	26.00	19	13.3	0.0137	0.01	6.48
120	15	10	20.00	16	13.8	0.0137	0.00	4.99
240	12	7	14.00	13	14.3	0.0137	0.00	3.49
480	10	5	10	11	14.7	0.0137	0.00	2.49
1440	8	3	6	9	15	0.0137	0.00	1.50

Hydrometer Particle Size Distribution



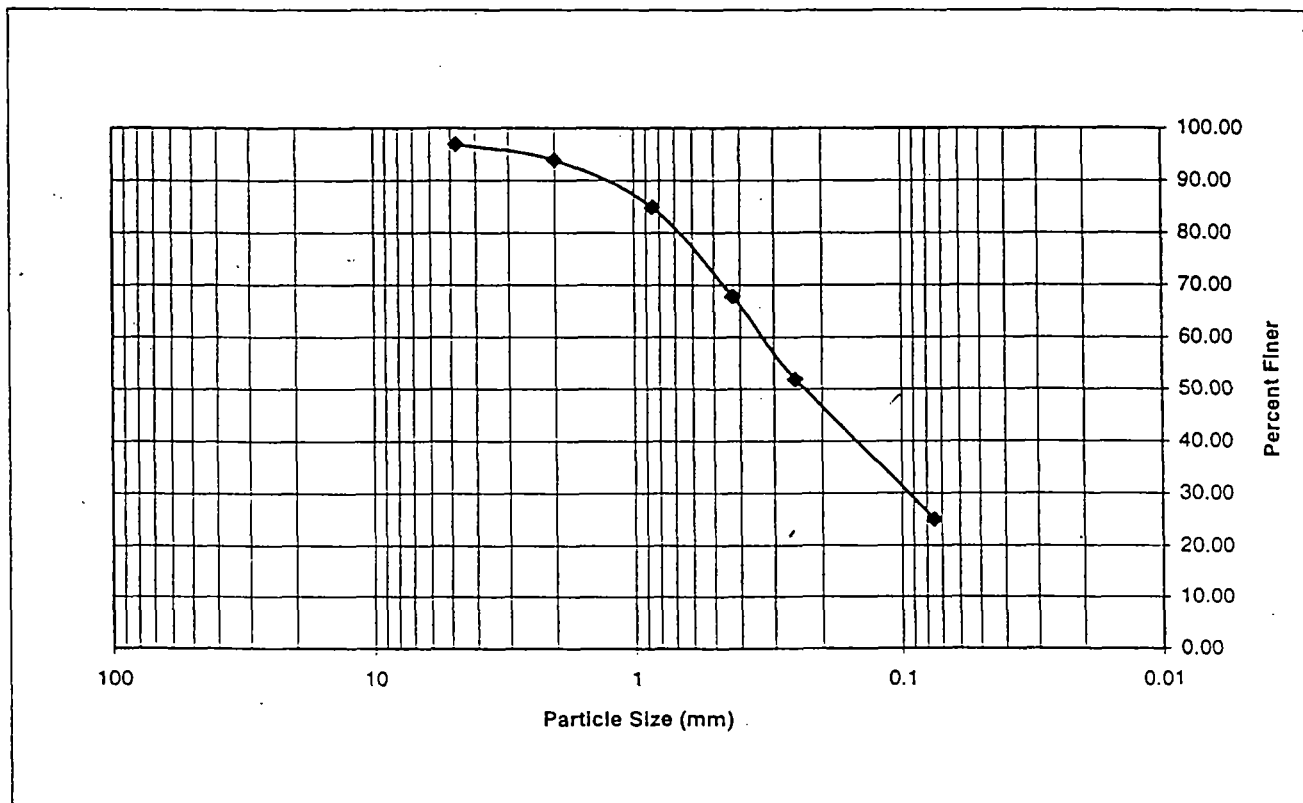
HYDROMETRICS, INC.  
 RUSTON LABORATORY  
 5227 NORTH 49TH STREET  
 RUSTON, WASHINGTON 98407

Laboratory Number: 98R-01154  
 Sample Number: EVT-9804-102  
 Date: 6/26/98

Weight of Oven Dry Sample (g): 241.4

<u>Sieve Number</u>	<u>Sieve Opening (mm)</u>	<u>Weight Retained</u>			
4	4.75	7.4	3.07	3.07	96.93
10	2.00	7.40	3.07	6.13	93.87
20	0.85	21.70	8.99	15.12	84.88
40	0.425	41.20	17.07	32.19	67.81
60	0.250	38.50	15.95	48.14	51.86
200	0.075	65.00	26.93	75.06	24.94
PAN	< 0.075	59.60	24.69		

sum = 240.8





# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-11A

Date Hole Started: 03/19/98 Date Hole Finished: 03/19/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 520 Pilchuck Path

Descriptive Location: Front yard (former stacks area)

Recorded By: B Thompson

Drilling Company: Hydrometrics, Inc.

Driller: R Yeager

Drilling Method: Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): 3x45'

Total Depth Drilled (ft): 5

WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 1 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe. Samples submitted to Hydrometrics, Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied. A one foot concrete cap with an aluminium ID tag was placed at the sample locations.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-151	GRAB			0.0 - 1.0'		0.0 - 1.0' Silty LOAM Brown, some gravel. (Fill)
	EVT-9803-152	GRAB			1.0 - 2.0'		1.0 - 3.0' SAND & SILT Brown, fine sand & silt, trace gravel, trace red brick fragments, some 2" darker brown horizons at 2-3'. (Smelter Debris)
	EVT-9803-153	GRAB			2.0 - 3.0'		3.0 - 4.0' BRICK Four to five rows of mortared brick, gray medium sand and silt. Greenish yellow residue coating bricks and filling cracks (moist). (Smelter Debris)
	EVT-9803-154	GRAB			3.0 - 4.0'		4.0 - 5.0' SAND & SILT Orange/brown fine sand and silt with trace gravel. Becomes very dense at 5'. Brown to black trace roots at base of excavation. (Fill)
	EVT-9803-155	GRAB			4.0 - 5.0'		



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Evaluate structures

Hole Name: TP-11B

Date Hole Started: 03/19/98 Date Hole Finished: 04/0

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 520 Pilchuck Path

Descriptive Location: Front yard (former stacks area)

Recorded By: JSwartz

Drilling Company: Hydrometrics, Inc.

Driller: JN/RV

Drilling Method: Hollow Stem Auger/Backhoe

Drilling Fluids Used: None

Purpose of Hole: Evaluate structures

Target Aquifer: N/A

Hole Diameter (in): TPB 3.5"; TP 3x45'

Total Depth Drilled (ft): 13.5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

1 ft. to 7'; 2' thereafter

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Test pit dug with a backhoe to 6', grab samples collected with a hand trowel and hoe; Continued drilling from 5' to 11' with Piper 2000 2 1/4" (ID) HSA, sampled with a 2" split spoon using "A" rod, a 140 lb. 30 inch drop safety hammer on a cat head. Samples submitted to Hydrometric Inc. Ruston laboratory for XRF analysis (As, Pb). Test pits were backfilled and BMPs were applied while test pit borings were abandoned with bentonite chips and a one foot concrete cap with an aluminium ID tag. Test pits also were topped with a concrete patch and aluminum ID tag. Borings adjacent to test pits were labeled TPB-[test pit number].

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-145	GRAB			0.0 - 1.0'		0.0 - 1.0' Silty LOAM
	EVT-9803-146	GRAB			1.0 - 2.0'		Brown, with trace gravel. [Fill]
	EVT-9803-147	GRAB			2.0 - 3.0'		1.0 - 3.0' SAND & SILT
	EVT-9803-148	GRAB			3.0 - 4.0'		Brown to dark brown, fine sand and silt with some fine to medium gra trace red brick. [Smelter Debris]
	EVT-9803-149	GRAB			4.0 - 5.0'		3.0 - 4.0' BRICK
5	EVT-9803-150	GRAB			5.0 - 6.0' Duplicate sample during drilling EVT-9804-109, 08:20, 3/8		Four to five rows of red brick and light gray medium sand. Slight yellc to white staining on sand & brick. [Smelter Debris]
	EVT-9804-110	SS	6/15	0.40	6.0 - 7.0'		4.0 - 6.0' SAND & SILT
							Orange/brown grading to light brown, fine sand and silt, trace gravel. Tree roots at base of excavation. [Fill]
	EVT-9804-111	SS	12/18	0.70	8.0 - 9.0' Duplicate sample @ 08:45 EVT-9804-114		6.0 - 7.0' Silty SAND
10							Light brown, fine to very fine grained, slightly moist, with 1" rounded gravel. [Fill]
	EVT-9804-112	SS	16/40	0.80	10.0 - 11.0'		7.0 - 13.5' Silty SAND
							Light brown with trace orange mottling, dry to slightly moist, medium dense, some interbedded fine grained sand lenses 1/4 to 1/8" thick th transitions to dry silt. Up to 30% silt. [Glacial Till]
	EVT-9804-113	SS	22/52	1.00	12.0 - 13.5'		
15							
20							

TP-11B  
10-11'

HYDROMETRICS, INC.  
RUSTON LABORATORY  
5227 NORTH 49TH STREET  
TACOMA, WASHINGTON 98407

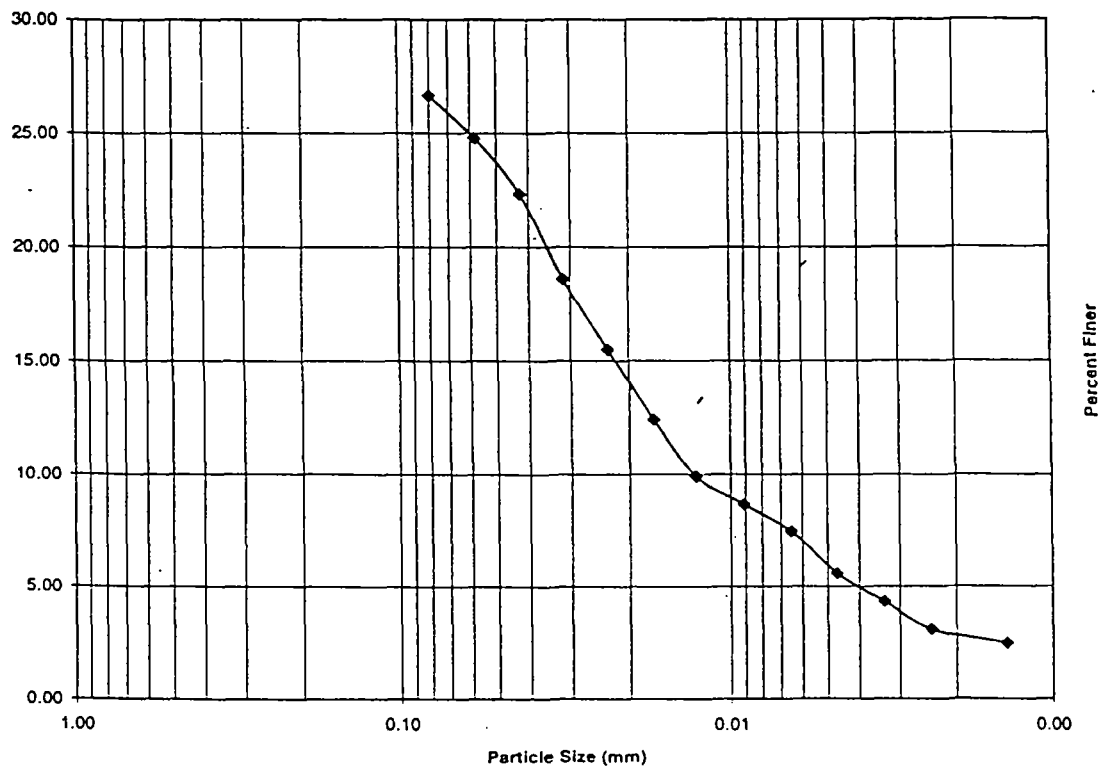
# HYDROMETER ANALYSIS

LABORATORY NUMBER  
SAMPLE NUMBER  
DATE  
ANALYST

98R-01164  
EVT-9804-112  
6/29/98  
SM

Time	Reading	Rcp	% Finer	Rcl	L	A	D	% Finer of Total
0.25	48	43	86.00	49	8.5	0.0137	0.08	26.65
0.5	45	40	80.00	46	9	0.0137	0.06	24.79
1	41	36	72.00	42	9.6	0.0137	0.04	22.31
2	35	30	60.00	36	10.6	0.0137	0.03	18.59
4	30	25	50.00	31	11.4	0.0137	0.02	15.50
8	25	20	40.00	26	12.2	0.0137	0.02	12.40
15	21	16	32.00	22	12.9	0.0137	0.01	9.92
30	19	14	28.00	20	13.2	0.0137	0.01	8.68
60	17	12	24.00	18	13.5	0.0137	0.01	7.44
120	14	9	18.00	15	14	0.0137	0.00	5.58
240	12	7	14.00	13	14.3	0.0137	0.00	4.34
480	10	5	10	11	14.7	0.0137	0.00	3.10
1440	9	4	8	10	14.8	0.0137	0.00	2.48

Hydrometer Particle Size Distribution



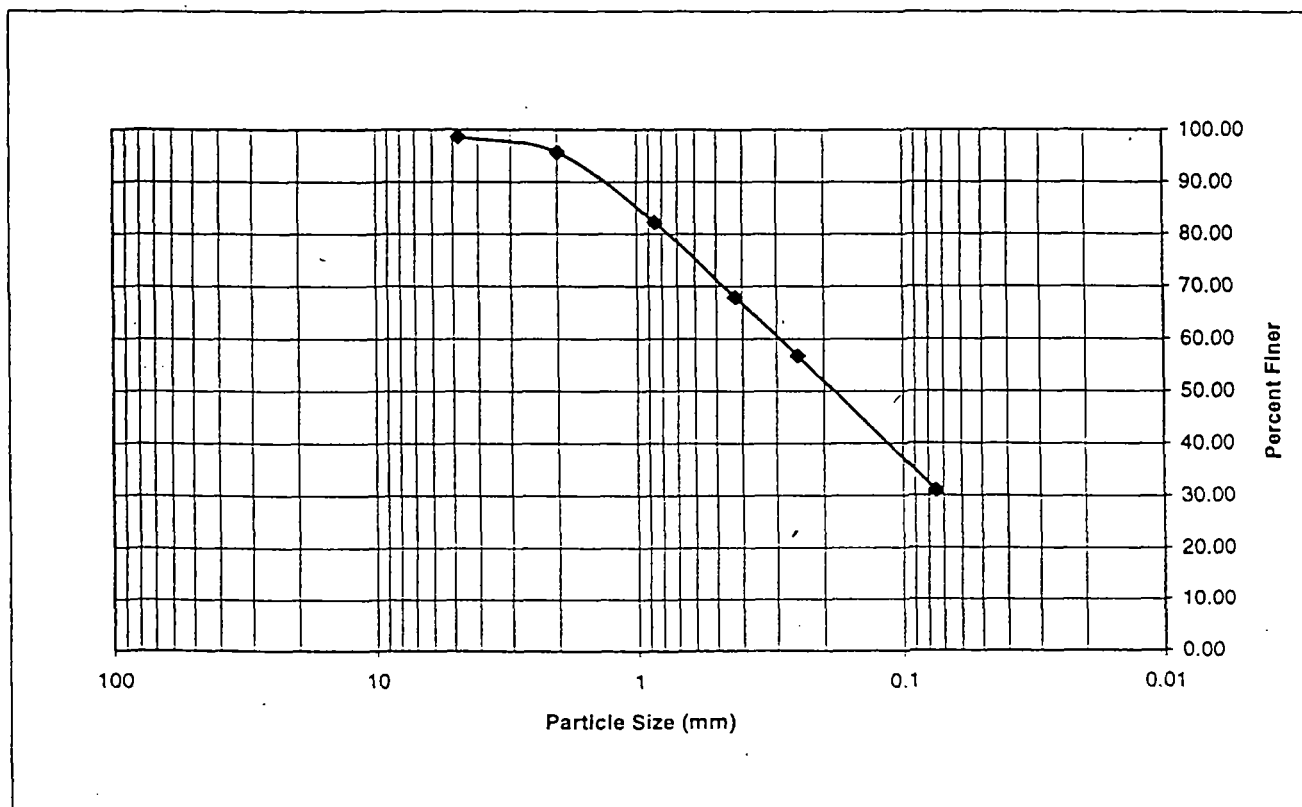
HYDROMETRICS, INC.  
 RUSTON LABORATORY  
 5227 NORTH 49TH STREET  
 RUSTON, WASHINGTON 98407

Laboratory Number: 98R-01164  
 Sample Number: EVT-9804-112  
 Date: 6/26/98

Weight of Oven Dry Sample (g): 301.7

Sieve Number	Sieve Opening (mm)	Weight Retained			
4	4.75	4.2	1.39	1.39	98.61
10	2.00	8.90	2.95	4.34	95.66
20	0.85	40.50	13.42	17.77	82.23
40	0.425	43.40	14.39	32.15	67.85
60	0.250	33.60	11.14	43.29	56.71
200	0.075	77.60	25.72	69.01	30.99
PAN	< 0.075	92.50	30.66		

sum = 300.7





# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

Hole Name: TB-1

Date Hole Started: 04/01/98 Date Hole Finished: 04/01/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: City of Everett

Legal Description: E Marine View Dr.

Descriptive Location: 20' S of Whsr access on E side.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Extent of Glacial Till

Target Aquifer: N/A

Hole Diameter (in): 8.5

Total Depth Drilled (ft): 36.5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis

5 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

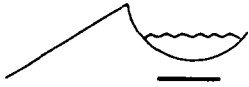
MP Elevation (ft):

Remarks: Boring drilled with a Mobile Drill B-61 with 4 1/4" (ID) Hollow Stem Auger. Samples obtained with a 2" split spoon, and "A" Rod under a 140 lb., 30" drop, winch release safety hammer. Samples submitted to Hydrometrics, Inc. Ruston lab for XRF analysis (As, Pb). Boring abandoned with bentonite grout, bentonite chips, and 1' concrete cap with an aluminum identification tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9804-519	GRAB			0.0 - 0.5'		0.0 - 1.0' <b>ASPHALT</b> Black asphalt and 1/2" angular gravel. [Road Pavement]
	EVT-9804-520	SS	5/10/98	1.40	2.0 - 3.5' Brick in cuttings.		1.0 - 8.0' <b>SILT</b> Blue-green to gray, slightly moist to dry, trace gravel and coarse sand; Concrete at 6-6.3'. [Fill]
5	EVT-9804-521	SS	18/10/10	1.40	5.0 - 6.5'	5	
	EVT-9804-522	SS	25/14/8	0.50	10.0 - 11.5'	10	8.0 - 13.5' <b>Gravelly Sandy SILT</b> Gray, slightly moist, slightly plastic; Sand is coarse to fine grained, angular to subrounded 1/2" gravel. [Till/Fill]
10	EVT-9804-523	SS	60/30/50-4	0.50	15.0 - 16.5'	15	13.5 - 18.5' <b>Silty Gravelly SAND</b> Light brown, medium to fine grained, slightly moist to dry; Gravel 1/2" subangular to subrounded. [Glacial Till]
15							18.5 - 23.0' <b>SAND &amp; GRAVEL</b> Brown, medium to fine grained, dry, dense to medium dense; Gravel is 3'
20						20	

Continued Next Page

Sheet 1 of 2



**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

**Hole Name: TB-1**

Date Hole Started: 04/01/98 Date Hole Finished: 04/01/98

(Continued)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9804-524	SS	30/32/50-4	0.50	20.0 - 21.5'		and smaller subrounded, green. [Glacial Till]
25							
	EVT-9804-525	SS	27/42/50-5	1.30	25.0 - 26.5'		23.0 - 28.5' <b>Silty SAND</b> Brown, medium to fine grained, slightly moist to dry, dense. [Glacial Till]
30							
	EVT-9804-526	SS	16/37/50-5	1.40	30.0 - 31.5'		28.5 - 33.0' <b>SILT</b> Light brown, dry, dense to hard, 1" sand lense at 31'. [Glacial Till]
35							
	EVT-9804-527	SS	19/33/38	1.50	35.0 - 36.5'		33.0 - 36.5' <b>SAND</b> Brown, black, and white, medium to coarse grained, slightly moist to dry, clean, dense to medium dense. [Advance Outwash]
40							
45							
50							

GEOTECH EVTSA-1.GPJ HYD.TUC.GOT 8/5/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

Hole Name: TB-2

Date Hole Started: 03/31/98 Date Hole Finished: 03/31/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: City of Everett

Legal Description: E Marine View Dr.

Descriptive Location: 195' S of Wrhsr access on E side.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Extent of Glacial Till

Target Aquifer: N/A

Hole Diameter (in): 8.5

Total Depth Drilled (ft): 36.5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y Metals Analysis 5 ft.

Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring drilled with a Mobile Drill B-61 with 4 1/4" (ID) Hollow Stem Auger. Samples obtained with a 2" split spoon, and "A" Rod under a 140 lb., 30" drop, winch release safety hammer. Samples submitted to Hydrometrics, Inc. Ruston lab for XRF analysis (As, Pb). Boring abandoned with bentonite grout, bentonite chips, and 1' concrete cap with an aluminum identification tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-511	SS			0.0 - 0.5'		0.0 - 0.5' <b>ASPHALT</b> Black, dry with 1/2" angular gravel. [Road Pavement]
	EVT-9803-512	SS	12/9/10	1.00	2.0 - 3.5'		0.5 - 8.0' <b>Sandy SILT</b> Light brown to gray with some orange staining, slightly moist, some red brick fragments and subrounded gravel. [Fill]
5	EVT-9803-513	SS	3/5/7	1.20	5.0 - 6.5' Smelter debris in cuttings: Red brick and yellow concrete.		
10	EVT-9803-514	SS	3/4/2	1.00	10.0 - 11.5'		8.0 - 15.0' <b>Silty SAND</b> Orange-gray with some black staining, fine grained to silty, dry, some wood fragments and root matter. [Till/Fill]
15	EVT-9803-515	SS	14/17/30	1.50	15.0 - 16.5'		15.0 - 25.0' <b>Silty SAND w/ Gravel</b> Light brown w/ some orange mottling, fine grained to silty, dry, medium dense to dense. Some 1/2" subrounded gravel. [Glacial Till]
20							

Continued Next Page

Sheet 1 of 2



**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

**Hole Name: TB-2**

Date Hole Started: 03/31/98 Date Hole Finished: 03/24/98

(Continued)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-516	SS	14/50-4	0.50	20.0 - 21.5'		
25							
		SS	100-4	0.00	25.0 - 26.5'		25.0 - 33.0' <b>SILT</b> Light brown with trace orange staining, dry, very dense, trace medium sand. [Glacial Till]
30							
	EVT-9803-517	SS	60/30/34	1.00	30.0 - 31.5' J Niederkorn est. from drilling sand 33'.		
35							33.0 - 36.5' <b>SAND</b> Black, brown, and white, medium grained, medium dense, clean, dry. [Advance Outwash]
	EVT-9803-518	SS	6/22/19	1.00	35.0 - 36.5'		
40							
45							
50							

GEOTECH EVTSA-1.GPJ HYD-TUC.GDT 8/5/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

Hole Name: TB-3

Date Hole Started: 03/31/98 Date Hole Finished: 03/31/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: City of Everett

Legal Description: E Marine View Dr.

Descriptive Location: 355' S of Whrsr access off on E side.

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Extent of Glacial Till

Target Aquifer: N/A

Hole Diameter (in): 8.5

Total Depth Drilled (ft): 39

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
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Well Installed?	N		
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Surface Casing Used?	N		
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Screen/Perforations?	N		
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Sand Pack?	N		
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Annular Seal?	N		
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Surface Seal?	N		
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DEVELOPMENT/SAMPLING			
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Well Developed?	N		
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Water Samples Taken?	N		
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Boring Samples Taken?	Y	Metals Analysis	5 ft.
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Static Water Level Below MP: N/A

Date: N/A

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring drilled with a Mobile Drill B-61 with 4 1/4" (ID) Hollow Stem Auger. Samples obtained with a 2" split spoon, and "A" Rod under a 140 lb., 30" drop, winch release safety hammer. Samples submitted to Hydrometrics, Inc. Ruston lab for XRF analysis (As, Pb). Boring abandoned with bentonite grout, bentonite chips, and 1' concrete cap with an aluminum identification tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-500	GRAB			0.0 - 0.5'		0.0 - 0.6' <b>ASPHALT</b> Black asphalt and 1/2" angular gravel. [Road Pavement]
	EVT-9803-501	SS	4/40/50-2	0.50	2.0 - 3.5' Cuttings had trace red brick frags.		0.6 - 8.0' <b>Silty SAND</b> Gray to light brown, slightly moist, loose, trace 1/4" subrounded gravel. [Road Base Fill]
5	EVT-9803-502	SS	6/3/6	0.50	5.0 - 6.5'		
10	EVT-9803-503	SS	4/3/3	0.40	10.0 - 11.5'		8.0 - 15.0' <b>Silty SAND</b> Light brown, medium to fine grained, slightly moist, 1/4 subrounded gravel trace wood fragments with purple staining at 10-11.5'. [Till/Fill]
15	EVT-9803-504	SS	7/15/21	1.50	15.0 - 16.5' Duplicate sample @ 08:40 EVT-9803-508		15.0 - 27.0' <b>Silty SAND</b> Light brown some orange mottling at 15', fine grained to silty, slightly moist to dry, medium dense, trace 1/4" subrounded gravel. [Glacial Till]
20							

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Sheet 1 of 2

GEOTECH EVTSA-1 GFI HYD-TUC.GDT 8/5/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

Hole Name: TB-3

Date Hole Started: 03/31/98 Date Hole Finished: 04/01/98

(Continued)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
	EVT-9803-505	SS	8/17/22	1.20	20.0 - 21.5'		
25	EVT-9803-506	SS	10/23/26	1.40	25.0 - 26.5'		
30	EVT-9803-507	SS	20/40/48	1.20	30.0 - 31.5' J Niederkorn says it drill like sand about 33'.		27.0 - 33.0' <b>Sandy SILT</b> Grayish brown, dry, medium to fine grained, medium dense to dense gravel, subrounded to round. [Glacial Till]
35	EVT-9803-509	SS	15/21/26	1.50	35.0 - 36.5'		33.0 - 39.0' <b>SAND</b> Brown, gray, and white, coarse to medium grained clean sand, medium dense, slightly moist to moist. [Advance Outwash]
40	EVT-9803-510	SS	8/16/13	1.00	37.5 - 39.0'		
45							
50							

GEOTECH EVT-SA-1.GPJ HYD-TUC.GDT 8/5/98



# HYDROMETRICS INC.

Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

Hole Name: TB-4

Date Hole Started: 03/31/98 Date Hole Finished: 03/31/98

Client: Asarco

Project: Smelter Area Investigation

County: Snohomish State: WA

Property Owner: Asarco

Legal Description: 450 Pilchuck Path

Descriptive Location: SW corner of back yard

Recorded By: J Swartz

Drilling Company: Hydrometrics, Inc.

Driller: J Niederkorn

Drilling Method: Hollow Stem Auger

Drilling Fluids Used: None

Purpose of Hole: Extent of Glacial Till

Target Aquifer: N/A

Hole Diameter (in): 8.5

Total Depth Drilled (ft): 91.5

## WELL COMPLETION Y/N DESCRIPTION INTERVAL

Well Installed? N

Surface Casing Used? N

Screen/Perforations? N

Sand Pack? N

Annular Seal? N

Surface Seal? N

## DEVELOPMENT/SAMPLING

Well Developed? N

Water Samples Taken? N

Boring Samples Taken? Y N/A

5 ft.

Static Water Level Below MP: 29

Date: 04/02/98

MP Description: Ground Surface

MP Height Above or Below Ground (ft): N/A

Surface Casing Height (ft):

Riser Height (ft):

Ground Surface Elevation (ft):

MP Elevation (ft):

Remarks: Boring drilled with a Mobile Drill B-61 with 4 1/4" (ID) Hollow Stem Auger. Samples obtained with a 2" split spoon, and "A" Rod under a 140 lb., 30" drop, winch release safety hammer to 50'. Switched to a 3" split spoon using "N" rod under a 300 lb., 30" drop, winch release safety hammer. Boring abandoned with bentonite grout, bentonite chips, and 1' concrete cap with an aluminum identification tag.

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
		SS	1/0/2	1.50	0.0 - 1.5' 300# hammer, 3" split spoon.		0.0 - 2.0' Silty LOAM Brown, moist to wet. [Fill]
							2.0 - 8.0' Sandy SILT Brown, wet, dense. [Glacial Till]
5		SS	49/50-3	0.00	5.0 - 6.5' 140# hammer, 2" split spoon.		
							8.0 - 23.0' Silty SAND Gray trace orange mottling, fine grained, dry, hard, trace 1/4" subangular to subrounded gravel; Becomes silty at 20'. [Glacial Till]
10		SS	14/57-6	0.50	10.0 - 11.5'		
15		SS	37/50-4	0.30	15.0 - 16.5'		
20							

Continued Next Page

Sheet 1 of 4

GEOTECH EVTSA-1 GRJ HYD-TUC.GDT 8/5/98



**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

**Hole Name: TB-4**

Date Hole Started: 03/31/98 Date Hole Finished: 02/24/99

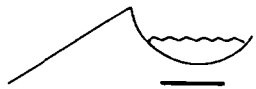
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DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
		SS	60/50-4	0.50	20.0 - 21.5'		
25		SS	57/50-3	0.50	25.0 - 26.5' Outside of spoon wet.		23.0 - 39.0' <b>Gravelly Sandy SILT</b> Gray, dry, dense to hard, some 1/4" subrounded gravel. [Glacial Till]
30		SS	49/50-2	0.50	30.0 - 31.5'		
35		SS	100-4	0.30	35.0 - 36.5'		
40		SS	46/50-3	1.50	40.0 - 41.5'		39.0 - 43.0' <b>SAND</b> Gray, wet, medium to fine grained, some 1" and smaller rounded gravel. [Glacial Till]
45		SS	31/50-4	0.60	45.0 - 46.5'		43.0 - 71.0' <b>SILT</b> Gray to dark gray, moist to wet, medium dense; Some 2" subrounded gravel (20-30% at 50-53'); Some medium to fine grained sand interbedded at 55' and 30-40% from 64-71'. [Glacial Till]
50		SS	17/50-4	0.50	50.0 - 51.5' Switch to 300# hammer and 3" split spoon.		

Continued Next Page

Sheet 2 of 2

GEOTECH EVTSA-1 GPJ HYD-TUC GDT 8/5/98



**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

**Hole Name: TB-4**

Date Hole Started: 03/31/98 Date Hole Finished: 03/31/98

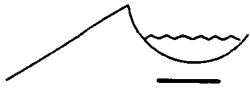
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DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
55		SS	17/16/32	1.00	55.0 - 56.5'		
60		SS	28/50-3	0.75	60.0 - 61.5'		
65		SS	15/25/39	1.50	65.0 - 66.5'		
70		SS	25/30/50	1.00	70.0 - 71.5'		
75		SS	30/50-5	0.90	75.0 - 76.5'		71.0 - 76.4' Silty SAND Gray, medium to fine grained, moist, dense with trace 1" subrounded gravel. [Glacial Till]
80		SS	25/50-2	0.50	80.0 - 81.5'		76.4 - 85.5' Clayey SILT Gray, dry, dense, trace sand and 1/4" subround gravel. [Glacial Till]
85							

Continued Next Page

Sheet 3 of 4

HYD-TUC-GDI 8/5/98  
GEOTECH EVTISA




**HYDROMETRICS INC.**  
Consulting Scientists and Engineers  
Tacoma, Washington

Till Boring

**Hole Name: TB-4**

Date Hole Started: 03/31/98 Date Hole Finished: 07/02/98

(Continued)

DEPTH	SAMPLE NUMBER	SAMPLE TYPE	BLOW COUNT	RECOVERY (feet)	DRILLING AND GEOTECHNICAL NOTES	GRAPHICS	GEOLOGICAL DESCRIPTION
		SS	32/50-5	1.00	85.0 - 86.5'		85.5 - 91.5' <b>Sandy SILT</b> Light brown, dry to slightly moist, sand is fine to medium grained; Some 1/2" rounded gravel. [Glacial Till]
90		SS	100/50-5	0.90	90.0 - 91.5'		
95							
100							
105							
110							
115							

## **APPENDIX C**

### **Summary of Samples Collected and Lead and Arsenic Concentrations Measured**

## SUMMARY OF SAMPLES ANALYZED FOR ARSENIC AND LEAD

SITE CODE	SAMPLE SITE	SAMPLE DATE	SAMPLE NO.	SAMPLE TIME	REMARKS	SAMPLE DEPTH	SAMPLED UNIT	ANALYTICAL RESULTS	
								As (mg/kg)	Pb (mg/kg)
HA1	SR-529 Interchange - North Side	04/08/98	EVT-9804-329	1450		0-6 in.	Fill	91	1221
HA1	SR-529 Interchange - North Side	04/08/98	EVT-9804-330	1455		6 in.-1 ft.	Fill	159	3582
HA1	SR-529 Interchange - North Side	04/08/98	EVT-9804-331	1500		2-2.5 ft.	Fill	10 U	11
HA1	SR-529 Interchange - North Side	04/08/98	EVT-9804-332	1505		4-4.5 ft.	Fill	10 U	10 U
HA10	SR-529 Interchange - North Side	04/09/98	EVT-9804-365	1345		0-6 in.	Fill	22	793
HA10	SR-529 Interchange - North Side	04/09/98	EVT-9804-366	1350		6 in.-1 ft.	Fill	10 U	174
HA10	SR-529 Interchange - North Side	04/09/98	EVT-9804-367	1355		2-2.5 ft.	Fill	10 U	80
HA10	SR-529 Interchange - North Side	04/09/98	EVT-9804-368	1400		4-4.5 ft.	Fill	349	1039
HA10	SR-529 Interchange - North Side	04/09/98	EVT-9804-378	1502	DUPLICATE	2-2.5 ft.	Fill	10 U	58
HA11	SR-529 Interchange - Central Median	04/09/98	EVT-9804-353	950		0-6 in.	Fill	10 U	852
HA11	SR-529 Interchange - Central Median	04/09/98	EVT-9804-354	955		6 in.-1 ft.	Fill	25	688
HA11	SR-529 Interchange - Central Median	04/09/98	EVT-9804-355	1000		2-2.5 ft.	Fill	10 U	27
HA11	SR-529 Interchange - Central Median	04/09/98	EVT-9804-356	1050		4-4.5 ft.	Fill	31	210
HA11	SR-529 Interchange - Central Median	04/09/98	EVT-9804-356	1005		4-4.5 ft.	Fill	20	183
HA12	SR-529 Interchange - South Side	04/08/98	EVT-9804-320	1215		0-6 in.	Fill	21	1086
HA12	SR-529 Interchange - South Side	04/08/98	EVT-9804-321	1220		6 in.-1 ft.	Fill	10 U	181
HA12	SR-529 Interchange - South Side	04/08/98	EVT-9804-322	1225		2-2.5 ft.	Fill	215	7186
HA12	SR-529 Interchange - South Side	04/08/98	EVT-9804-323	1230		4-4.5 ft.	Fill	10 U	13
HA13	SR-529 Interchange - North Side	04/08/98	EVT-9804-341	1550		0-6 in.	Fill	10 U	25
HA13	SR-529 Interchange - North Side	04/08/98	EVT-9804-342	1555		6 in.-1 ft.	Fill	10 U	26
HA13	SR-529 Interchange - North Side	04/08/98	EVT-9804-343	1600		2-2.5 ft.	Fill	10 U	10 U
HA13	SR-529 Interchange - North Side	04/08/98	EVT-9804-344	1605		4-4.5 ft.	Fill	10 U	12
HA14	SR-529 Interchange - North Side	04/09/98	EVT-9804-361	1320		0-6 in.	Fill	12	663
HA14	SR-529 Interchange - North Side	04/09/98	EVT-9804-362	1325		6 in.-1 ft.	Fill	20	62
HA14	SR-529 Interchange - North Side	04/09/98	EVT-9804-363	1330		2-2.5 ft.	Fill	10 U	10 U
HA14	SR-529 Interchange - North Side	04/09/98	EVT-9804-364	1335		4-4.5 ft.	Fill	45	40
HA15	SR-529 Interchange - Central Median	04/09/98	EVT-9804-357	1040		0-6 in.	Fill	17	780
HA15	SR-529 Interchange - Central Median	04/09/98	EVT-9804-358	1045		6 in.-1 ft.	Fill	32	1439
HA15	SR-529 Interchange - Central Median	04/09/98	EVT-9804-359	1050		2-2.5 ft.	Fill	12	56
HA15	SR-529 Interchange - Central Median	04/09/98	EVT-9804-360	1055		4-4.5 ft.	Fill	10 U	1236
HA16	SR-529 Interchange - South Side	04/08/98	EVT-9804-324	1340		0-6 in.	Fill	19	641
HA16	SR-529 Interchange - South Side	04/08/98	EVT-9804-325	1345		6 in.-1 ft.	Fill	32	625
HA16	SR-529 Interchange - South Side	04/08/98	EVT-9804-326	1350		2-2.5 ft.	Fill	10 U	16
HA16	SR-529 Interchange - South Side	04/08/98	EVT-9804-327	1355		4-4.5 ft.	Fill	19	15
HA16	SR-529 Interchange - South Side	04/08/98	EVT-9804-328	1400	DUPLICATE	2-2.5 ft.	Fill	10 U	30
HA2	SR-529 Interchange - North Side	04/09/98	EVT-9804-373	1430		0-6 in.	Fill	11	1003
HA2	SR-529 Interchange - North Side	04/09/98	EVT-9804-374	1435		6 in.-1 ft.	Fill	11	539
HA2	SR-529 Interchange - North Side	04/09/98	EVT-9804-375	1440		2-2.5 ft.	Fill	21	331
HA2	SR-529 Interchange - North Side	04/09/98	EVT-9804-376	1445		4-4.5 ft.	Fill	52	219
HA3	SR-529 Interchange - Central Median	04/09/98	EVT-9804-345	905		0-6 in.	Fill	16 J4	686 J4
HA3	SR-529 Interchange - Central Median	04/09/98	EVT-9804-346	910		6 in.-1 ft.	Fill	16 J4	1049 J4
HA3	SR-529 Interchange - Central Median	04/09/98	EVT-9804-347	915		2-2.5 ft.	Fill	296 J4	323 J4
HA3	SR-529 Interchange - Central Median	04/09/98	EVT-9804-348	920		4-4.5 ft.	Fill	389 J4	758 J4
HA3	SR-529 Interchange - Central Median	04/09/98	EVT-9804-377	1402	DUPLICATE	2-2.5 ft.	Fill	187 J4	188 J4
HA4	SR-529 Interchange - South Side	04/08/98	EVT-9804-312	1135		0-6 in.	Fill	30	925
HA4	SR-529 Interchange - South Side	04/08/98	EVT-9804-313	1140		6 in.-1 ft.	Fill	20	338
HA4	SR-529 Interchange - South Side	04/08/98	EVT-9804-314	1145		2-2.5 ft.	Fill	10 U	59
HA4	SR-529 Interchange - South Side	04/08/98	EVT-9804-315	1150		4-4.5 ft.	Fill	10 U	10 U
HA5	SR-529 Interchange - North Side	04/08/98	EVT-9804-333	1510		0-6 in.	Fill	10 U	14
HA5	SR-529 Interchange - North Side	04/08/98	EVT-9804-334	1515		6 in.-1 ft.	Fill	10 U	10 U
HA5	SR-529 Interchange - North Side	04/08/98	EVT-9804-335	1520		2-2.5 ft.	Fill	10 U	10 U
HA5	SR-529 Interchange - North Side	04/08/98	EVT-9804-336	1525		4-4.5 ft.	Fill	10 U	10 U
HA6	SR-529 Interchange - North Side	04/09/98	EVT-9804-369	1410		0-6 in.	Fill	11	738
HA6	SR-529 Interchange - North Side	04/09/98	EVT-9804-370	1415		6 in.-1 ft.	Fill	10 U	160
HA6	SR-529 Interchange - North Side	04/09/98	EVT-9804-371	1420		2-2.5 ft.	Fill	10 U	13
HA6	SR-529 Interchange - North Side	04/09/98	EVT-9804-372	1425		4-4.5 ft.	Fill	10 U	166
HA7	SR-529 Interchange - Central Median	04/09/98	EVT-9804-349	930		0-6 in.	Fill	15	295
HA7	SR-529 Interchange - Central Median	04/09/98	EVT-9804-350	935		6 in.-1 ft.	Fill	15	276
HA7	SR-529 Interchange - Central Median	04/09/98	EVT-9804-351	940		2-2.5 ft.	Fill	21	351
HA7	SR-529 Interchange - South Side	04/08/98	EVT-9804-316	1155		0-6 in.	Fill	20	755
HA8	SR-529 Interchange - South Side	04/08/98	EVT-9804-317	1200	WET CHEM	6 in.-1 ft.	Fill	18 U	20 U
HA8	SR-529 Interchange - South Side	04/08/98	EVT-9804-318	1205		2-2.5 ft.	Fill	10 U	190
HA8	SR-529 Interchange - South Side	04/08/98	EVT-9804-319	1210		4-4.5 ft.	Fill	10 U	10 U
HA9	SR-529 Interchange - North Side	04/08/98	EVT-9804-337	1530		0-6 in.	Fill	10 U	21
HA9	SR-529 Interchange - North Side	04/08/98	EVT-9804-338	1535		6 in.-1 ft.	Fill	10 U	21
HA9	SR-529 Interchange - North Side	04/08/98	EVT-9804-339	1540		2-2.5 ft.	Fill	10 U	23
HA9	SR-529 Interchange - North Side	04/08/98	EVT-9804-340	1545		4-4.5 ft.	Fill	10 U	10 U
SA1	Roasting Area - Dust Chambers	03/23/98	EVT-9803-363	1530		0-1 ft.	Smelter Debris	1427	1038
SA1	Roasting Area - Dust Chambers	03/23/98	EVT-9803-364	1535		1-2 ft.	Smelter Debris	682	387
SA1	Roasting Area - Dust Chambers	03/23/98	EVT-9803-365	1540		2-3 ft.	Smelter Debris	818	89
SA1	Roasting Area - Dust Chambers	03/23/98	EVT-9803-366	1545		3-4 ft.	Smelter Debris	320	17
SA1	Roasting Area - Dust Chambers	03/23/98	EVT-9803-367	1550		4-5 ft.	Smelter Debris	3841	1083
SA1	Roasting Area - Dust Chambers	03/23/98	EVT-9803-368	1555		6-6.25 ft.	Smelter Debris	515	77
SA10	South of Arsenic Process Area	03/19/98	EVT-9803-325B	955		0-1 ft.	Fill	312	113
SA10	South of Arsenic Process Area	03/19/98	EVT-9803-326	1000		1-2 ft.	Fill	10 U	10 U
SA10	South of Arsenic Process Area	03/19/98	EVT-9803-327	1005		2-3 ft.	Fill	70	10 U
SA10	South of Arsenic Process Area	03/19/98	EVT-9803-328	1010		3-4 ft.	Fill	10 U	10 U
SA10	South of Arsenic Process Area	03/19/98	EVT-9803-329	1012	DUPLICATE	3-4 ft.	Fill	10 U	10 U
SA10	South of Arsenic Process Area	03/19/98	EVT-9803-330	1015		4-5 ft.	Fill	14	10 U
SA11	South of Arsenic Process Area	03/18/98	EVT-9803-310	1500		0-1 ft.	Fill (Loam)	258	101
SA11	South of Arsenic Process Area	03/18/98	EVT-9803-311	1505		1-2 ft.	Fill	231	10 U
SA11	South of Arsenic Process Area	03/18/98	EVT-9803-312	1515		2-3 ft.	Fill	10 U	11
SA11	South of Arsenic Process Area	03/18/98	EVT-9803-313	1520		3-4 ft.	Fill	10 U	10 U

## SUMMARY OF SAMPLES ANALYZED FOR ARSENIC AND LEAD

SITE CODE	SAMPLE SITE	SAMPLE DATE	SAMPLE NO.	SAMPLE TIME	REMARKS	SAMPLE DEPTH	SAMPLED UNIT	ANALYTICAL RESULTS	
								As (mg/kg)	Pb (mg/kg)
SA11	South of Arsenic Process Area	03/18/98	EVT-9803-314	1525		4-5 ft.	Glacial Till	10 U	12
SA12	South of Arsenic Process Area	03/19/98	EVT-9803-339	1055		0-1 ft.	Fill	968	604
SA12	South of Arsenic Process Area	03/19/98	EVT-9803-340	1100		1-2 ft.	Smelter Debris	125	52
SA12	South of Arsenic Process Area	03/19/98	EVT-9803-341	1105		2-3 ft.	Fill	14	11
SA12	South of Arsenic Process Area	03/19/98	EVT-9803-342	1110		3-4 ft.	Fill	10 U	10 U
SA12	South of Arsenic Process Area	03/19/98	EVT-9803-343	1115		4-5 ft.	Fill	10 U	13
SA13	Stack Area	03/25/98	EVT-9803-414	1430		0-1 ft.	Fill	846	281
SA13	Stack Area	03/25/98	EVT-9803-415	1435		1-2 ft.	Fill	1024	212
SA13	Stack Area	03/25/98	EVT-9803-416	1440		2-3 ft.	Glacial Till	13 J4	12
SA13	Stack Area	03/25/98	EVT-9803-417	1445		3-4 ft.	Glacial Till	227 J4	10 U
SA13	Stack Area	03/25/98	EVT-9803-418	1450		4-5 ft.	Glacial Till	42 J4	10 U
SA13	Stack Area	03/25/98	EVT-9803-419	1500	DUPLICATE	3-4 ft.	Glacial Till	352 J4	10 U
SA14	Stack Area	03/23/98	EVT-9803-385	1640		0-1 ft.	Fill	11	10 U
SA14	Stack Area	03/23/98	EVT-9803-386	1645		1-2 ft.	Fill	10 U	10 U
SA14	Stack Area	03/23/98	EVT-9803-387	1650		2-3 ft.	Fill	10 U	13
SA14	Stack Area	03/23/98	EVT-9803-388	1655		3-4 ft.	Glacial Till	10 U	10
SA14	Stack Area	03/23/98	EVT-9803-389	1700		4-5 ft.	Glacial Till	10 U	10 U
SA14	Stack Area	03/23/98	EVT-9803-390	1705	DUPLICATE	0-1 ft.	Fill	10	10 U
SA15	Stack Area	03/25/98	EVT-9803-398	940		0-1 ft.	Smelter Debris	113	35
SA15	Stack Area	03/25/98	EVT-9803-399	945		1-2 ft.	Smelter Debris	10 U	11
SA15	Stack Area	03/25/98	EVT-9803-400	950		2-3 ft.	Glacial Till	10 U	10 U
SA15	Stack Area	03/25/98	EVT-9803-401	955		3-4 ft.	Glacial Till	10 U	10 U
SA15	Stack Area	03/25/98	EVT-9803-402	1000		4-5 ft.	Glacial Till	10 U	10 U
SA16	Stack Area	03/25/98	EVT-9803-408	1135		0-1 ft.	Smelter Debris	405	22
SA16	Stack Area	03/25/98	EVT-9803-409	1140		1-2 ft.	Smelter Debris	51	10 U
SA16	Stack Area	03/25/98	EVT-9803-410	1145		2-3 ft.	Smelter Debris	166	23
SA16	Stack Area	03/25/98	EVT-9803-411	1150		3-4 ft.	Glacial Till	10 U	10 U
SA16	Stack Area	03/25/98	EVT-9803-412	1155		4-5 ft.	Glacial Till	10 U	10 U
SA16	Stack Area	03/25/98	EVT-9803-413	1200	DUPLICATE	2-3 ft.	Smelter Debris	232	41
SA17	Stack Area	03/25/98	EVT-9803-403	1030		0-1 ft.	Smelter Debris	811	239
SA17	Stack Area	03/25/98	EVT-9803-404	1035		1-2 ft.	Smelter Debris	610	103
SA17	Stack Area	03/25/98	EVT-9803-405	1040		2-3 ft.	Glacial Till	10 U	10 U
SA17	Stack Area	03/25/98	EVT-9803-406	1045		3-4 ft.	Glacial Till	10 U	10 U
SA17	Stack Area	03/25/98	EVT-9803-407	1050		4-5 ft.	Glacial Till	10 U	10 U
SA18	Stack Area	03/25/98	EVT-9803-420	1530		0-1 ft.	Fill (Loam)	1798	713
SA18	Stack Area	03/25/98	EVT-9803-421	1535		1-2 ft.	Fill	288	10 U
SA18	Stack Area	03/25/98	EVT-9803-422	1540		2-3 ft.	Fill	18	10 U
SA18	Stack Area	03/25/98	EVT-9803-423	1545		3-4 ft.	Glacial Till	10 U	10 U
SA18	Stack Area	03/25/98	EVT-9803-424	1500		4-5 ft.	Glacial Till	18 U	20 U
SA18	Stack Area	03/25/98	EVT-9803-424	1550		4-5 ft.	Glacial Till	13	10 U
SA19	Medora Way	03/30/98	EVT-9803-453	1610		0-1 ft.	Fill (Loam)	44	84
SA19	Medora Way	03/30/98	EVT-9803-454	1615		1-2 ft.	Fill (Loam)	10 U	11
SA19	Medora Way	03/30/98	EVT-9803-455	1620		2-3 ft.	Glacial Till	10 U	12
SA19	Medora Way	03/30/98	EVT-9803-457	1625		3-4 ft.	Glacial Till	10 U	10 U
SA19	Medora Way	03/30/98	EVT-9803-458	1630		4-5 ft.	Glacial Till	10 U	10 U
SA2	Roasting Area - Dust Chambers	03/23/98	EVT-9803-369	820		0-1 ft.	Road Pavement/Base Fill	2351	1141
SA2	Roasting Area - Dust Chambers	03/23/98	EVT-9803-370	825		1-2 ft.	Smelter Debris	4171	1128
SA2	Roasting Area - Dust Chambers	03/23/98	EVT-9803-371	830		2-3 ft.	Glacial Till	2014	10 U
SA2	Roasting Area - Dust Chambers	03/23/98	EVT-9803-372	835		3-4 ft.	Glacial Till	158	10 U
SA2	Roasting Area - Dust Chambers	03/23/98	EVT-9803-373	840		5-6 ft.	Glacial Till	40	11
SA2	Roasting Area - Dust Chambers	03/23/98	EVT-9803-374	845		6-7 ft.	Glacial Till	17	10 U
SA2	Roasting Area - Dust Chambers	03/23/98	EVT-9803-375	850	DUPLICATE	3-4 ft.	Glacial Till	125	10 U
SA20	Medora Way	03/30/98	EVT-9803-448	1515		0-1 ft.	Fill (Loam)	589	1123
SA20	Medora Way	03/30/98	EVT-9803-449	1520		1-2 ft.	Fill (Loam)	837	1390
SA20	Medora Way	03/30/98	EVT-9803-450	1525		2-3 ft.	Glacial Till	10 U	13
SA20	Medora Way	03/30/98	EVT-9803-451	1530		3-4 ft.	Glacial Till	10 U	14
SA20	Medora Way	03/30/98	EVT-9803-452	1535		4-5 ft.	Glacial Till	10 U	10 U
SA21	Whitehorse Trail	03/30/98	EVT-9803-444A	1420		0-1 ft.	Fill (Loam)	275	323
SA21	Whitehorse Trail	03/30/98	EVT-9803-444B	1425		1-2 ft.	Fill (Loam)	331	387
SA21	Whitehorse Trail	03/30/98	EVT-9803-445	1430		2-3 ft.	Smelter Debris	290	344
SA21	Whitehorse Trail	03/30/98	EVT-9803-446	1435		3-4 ft.	Smelter Debris	104	140
SA21	Whitehorse Trail	03/30/98	EVT-9803-447A	1440		4-5 ft.	Glacial Till	10 U	10 U
SA21	Whitehorse Trail	03/30/98	EVT-9803-447B	1445	DUPLICATE	0-1 ft.	Fill (Loam)	252	304
SA22	Medora Way	04/08/98	EVT-9804-306	907		0-1 ft.	Road Pavement/Base Fill	42	20 U
SA22	Medora Way	04/08/98	EVT-9804-306	907		0-1 ft.	Road Pavement/Base Fill	37	10 U
SA22	Medora Way	04/08/98	EVT-9804-307	910		1-2 ft.	Road Base Fill	20	10
SA22	Medora Way	04/08/98	EVT-9804-308	915		2-3 ft.	Road Base Fill	20	11
SA22	Medora Way	04/08/98	EVT-9804-309	920		3-4 ft.	Road Base Fill	30	50
SA22	Medora Way	04/08/98	EVT-9804-310	925		4-5 ft.	Glacial Till	10 U	10 U
SA22	Medora Way	04/08/98	EVT-9804-311	930	DUPLICATE	4-5 ft.	Glacial Till	10 U	10 U
SA23	SR 529 Median	03/26/98	EVT-9803-425	830		0-1 ft.	Fill (Loam)	25	211
SA23	SR 529 Median	03/26/98	EVT-9803-426	835		1-2 ft.	Glacial Till	12	28
SA23	SR 529 Median	03/26/98	EVT-9803-427	840		2-3 ft.	Glacial Till	10 U	19
SA23	SR 529 Median	03/26/98	EVT-9803-428	845		3-4 ft.	Glacial Till	12	82
SA23	SR 529 Median	03/26/98	EVT-9803-429	850		4-5 ft.	Glacial Till	10 U	36
SA23	SR 529 Median	03/26/98	EVT-9803-430	855	DUPLICATE	4-5 ft.	Glacial Till	10 U	35
SA24	East Marine View Drive	04/01/98	EVT-9804-300	14:40 WET CHEM		0-1 ft.	Road Pavement	18 U	20 U
SA24	East Marine View Drive	04/01/98	EVT-9804-301	1445		1-2 ft.	Road Base Fill	10 U	10 U
SA24	East Marine View Drive	04/01/98	EVT-9804-302	1450		2-3 ft.	Glacial Till	36	63
SA24	East Marine View Drive	04/01/98	EVT-9804-303	1455		3-4 ft.	Glacial Till	10 U	10 U
SA24	East Marine View Drive	04/01/98	EVT-9804-304	1500		4-5 ft.	Glacial Till	10 U	17
SA25	South of Arsenic Process Area	03/18/98	EVT-9803-315	1640		0-1 ft.	Road Pavement/Base Fill	249	36
SA25	South of Arsenic Process Area	03/18/98	EVT-9803-316	1645		1-2 ft.	Road Base Fill	429	43

### SUMMARY OF SAMPLES ANALYZED FOR ARSENIC AND LEAD

SUMMARY OF SAMPLES ANALYZED FOR ARSENIC AND LEAD							ANALYTICAL RESULTS		
SITE CODE	SAMPLE SITE	SAMPLE DATE	SAMPLE NO.	SAMPLE TIME	REMARKS	SAMPLE DEPTH	SAMPLED UNIT	As	Pb
								(mg/kg)	(mg/kg)
SA25	South of Arsenic Process Area	03/18/98	EVT-9803-317	1655		2-3 ft.	Road Base Fill	122	10
SA25	South of Arsenic Process Area	03/18/98	EVT-9803-318	1700		3-4 ft.	Road Base Fill	10 U	10 U
SA25	South of Arsenic Process Area	03/18/98	EVT-9803-319	1705	DUPLICATE	3-4 ft.	Road Base Fill	10 U	10 U
SA25	South of Arsenic Process Area	03/18/98	EVT-9803-320	1710		4-5 ft.	Road Base Fill	140	12
SA26	South of Arsenic Process Area	03/19/98	EVT-9803-321	855		0-1 ft.	Road Pavement/Base Fill	228	72
SA26	South of Arsenic Process Area	03/19/98	EVT-9803-322	900		1-2 ft.	Road Base Fill	1105	257
SA26	South of Arsenic Process Area	03/19/98	EVT-9803-323	905		2-3 ft.	Road Base Fill	390	10
SA26	South of Arsenic Process Area	03/19/98	EVT-9803-324	910		3-4 ft.	Road Base Fill	54	10 U
SA26	South of Arsenic Process Area	03/19/98	EVT-9803-325A	9:50		4-5 ft.	Road Base Fill	97	20 U
SA26	South of Arsenic Process Area	03/19/98	EVT-9803-325A	915		4-5 ft.	Road Base Fill	101	10 U
SA3	Roasting Area - Ore Shed	03/26/98	EVT-9803-431	910		0-1 ft.	Loam	13	1315
SA3	Roasting Area - Ore Shed	03/26/98	EVT-9803-432	915		1-2 ft.	Sand	21	118
SA3	Roasting Area - Ore Shed	03/26/98	EVT-9803-433	920		2-3 ft.	Glacial Till	21	106
SA3	Roasting Area - Ore Shed	03/26/98	EVT-9803-434	925		3-4 ft.	Glacial Till	10 U	10 U
SA4	Roasting Area - Southwest Part	03/25/98	EVT-9803-391	800		0-1 ft.	Fill (Loam)	11792	12116
SA4	Roasting Area - Southwest Part	03/25/98	EVT-9803-392	805		1-2 ft.	Smelter Debrns	2618	530
SA4	Roasting Area - Southwest Part	03/25/98	EVT-9803-393	810		2-3 ft.	Glacial Till	13	22
SA4	Roasting Area - Southwest Part	03/25/98	EVT-9803-394	815		3-4 ft.	Glacial Till	26	14
SA4	Roasting Area - Southwest Part	03/25/98	EVT-9803-395	820		4-5 ft.	Glacial Till	14	10 U
SA4	Roasting Area - Southwest Part	03/25/98	EVT-9803-396	825		5-6 ft.	Glacial Till	10 U	10 U
SA4	Roasting Area - Southwest Part	03/25/98	EVT-9803-397	830	DUPLICATE	4-5 ft.	Glacial Till	10 U	12
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-376	1015		0-1 ft.	Fill (Loam)	4750	947
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-376	1015	DUPLICATE	0-1 ft.	Fill (Loam)	4677	942
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-377	1020		1-2 ft.	Smelter Debris	808	115
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-378	1025		2-3 ft.	Smelter Debris	47	14
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-379	1030		3-4 ft.	Smelter Debris	60	14
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-380	1035		4-5 ft.	Smelter Debris	11	15
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-381	1040		5-6 ft.	Smelter Debris	35	17
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-382	1045		8-9 ft.	Glacial Till	317	10 U
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-383	1050		11-12 ft.	Glacial Till	280	10 U
SA5	Blast Furnace/Lead Refining Area	03/23/98	EVT-9803-384	1055		14-15 ft.	Glacial Till	61	13
SA6	Arsenic Process Area - Ovens	03/20/98	EVT-9803-353	940		0-1 ft.	Loam	3633 J4	304
SA6	Arsenic Process Area - Ovens	03/20/98	EVT-9803-354	945		1-2 ft.	Loam/Smelter Debris	39777	1327
SA6	Arsenic Process Area - Ovens	03/20/98	EVT-9803-356	1030		2-3 ft.	Smelter Debris	40938	41
SA6	Arsenic Process Area - Ovens	03/20/98	EVT-9803-357	1035		3-4 ft.	Smelter Debris	33201	20
SA6	Arsenic Process Area - Ovens	03/20/98	EVT-9803-358	1100	DUPLICATE	0-1 ft.	Loam	2208 J4	215
SA6	Arsenic Process Area - Ovens	03/20/98	EVT-9803-359	1350		4-5 ft.	Glacial Till	7903 J4	10 U
SA6	Arsenic Process Area - Ovens	03/20/98	EVT-9803-360	1355		5-6 ft.	Glacial Till	1260 J4	10 U
SA6	Arsenic Process Area - Ovens	03/20/98	EVT-9803-361	1425		7.5-9 ft.	Glacial Till	2761 J4	10 U
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-344	1310		0-1 ft.	Fill (Loam)	19122	486
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-345	1315		1-2 ft.	Fill (Loam)	38751	563
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-346	1330		2-3 ft.	Fill	14277	10 U
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-347	1335		3-4 ft.	Fill	7476	10 U
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-348	1430		4-5 ft.	Fill	5245	10 U
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-349	1435		5-6 ft.	Fill	1348	10 U
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-350	1437	DUPLICATE	5-6 ft.	Fill	1050	10 U
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-351	1600		7.5-9 ft.	Glacial Till	402	10 U
SA7	Arsenic Process Area - Storage Bin	03/19/98	EVT-9803-352	1610		10-11 ft.	Glacial Till	258	10 U
SA8	South of Arsenic Process Area	03/18/98	EVT-9803-305	1340		0-1 ft.	Fill	1208	199
SA8	South of Arsenic Process Area	03/18/98	EVT-9803-306	1345		1-2 ft.	Fill	111	12
SA8	South of Arsenic Process Area	03/18/98	EVT-9803-307	1405		2-3 ft.	Glacial Till	79	10 U
SA8	South of Arsenic Process Area	03/18/98	EVT-9803-308	1410		3-4 ft.	Glacial Till	42	10 U
SA8	South of Arsenic Process Area	03/18/98	EVT-9803-309	1420		4-5 ft.	Glacial Till	52	10 U
SA9	South of Arsenic Process Area	03/18/98	EVT-9803-300	1245		0-1 ft.	Fill	798	473
SA9	South of Arsenic Process Area	03/18/98	EVT-9803-301	1250		1-2 ft.	Fill	813	625
SA9	South of Arsenic Process Area	03/18/98	EVT-9803-302	1305		2-3 ft.	Fill	1078	436
SA9	South of Arsenic Process Area	03/18/98	EVT-9803-303	1310		3-4 ft.	Glacial Till	1189	221
SA9	South of Arsenic Process Area	03/18/98	EVT-9803-304	1325		4-5 ft.	Glacial Till	51	11
HA17	SR 529 Hwy Interchange - Field ID #1	04/03/98	EVT-9804-600	1330		SURFACE	Fill/Soil	18	35
HA18	SR 529 Hwy Interchange - Field ID #2	04/03/98	EVT-9804-601	1335		SURFACE	Fill/Soil	82	364
HA19	SR 529 Hwy Interchange - Field ID #3	04/03/98	EVT-9804-602	1340		SURFACE	Fill/Soil	15	14
HA20	SR 529 Hwy Interchange - Field ID #4	04/03/98	EVT-9804-603	1345		SURFACE	Fill/Soil	64	403
HA20	SR 529 Hwy Interchange - Field ID #4	04/03/98	EVT-9804-604	1350	DUPLICATE	SURFACE	Fill/Soil	65	329
TB1	East Marine View Drive	04/01/98	EVT-9804-520	845		2-3.5 ft.	Fill	46	27 J4
TB1	East Marine View Drive	04/01/98	EVT-9804-521	850		5-6.5 ft.	Fill	48	417
TB1	East Marine View Drive	04/01/98	EVT-9804-522	855		10-11.5 ft.	Glacial Till	695	63 J4
TB1	East Marine View Drive	04/01/98	EVT-9804-523	900		15-16.5 ft.	Glacial Till	455	13 J4
TB1	East Marine View Drive	04/01/98	EVT-9804-524	905		20-21.5 ft.	Glacial Till	197	12 J4
TB1	East Marine View Drive	04/01/98	EVT-9804-525	910		25-26.5 ft.	Glacial Till	201	10 U,UJ4
TB1	East Marine View Drive	04/01/98	EVT-9804-526	915		30-31.5 ft.	Glacial Till	120	10 U,UJ4
TB1	East Marine View Drive	04/01/98	EVT-9804-527	920		35-36.5 ft.	Fluvial Sand	76	10 U,UJ4
TB1	East Marine View Drive	04/01/98	EVT-9804-530	935	DUPLICATE	2-3.5 ft.	Fill	60	54 J4
TB1	East Marine View Drive	04/01/98	EVT-9804-519	840	WET CHEM	0-0.5 ft.	Road Pavement	18 U	20 U
TB2	East Marine View Drive	03/31/98	EVT-9803-511	1345		0-0.5 ft.	Road Pavement/Fill	10 U	10 U
TB2	East Marine View Drive	03/31/98	EVT-9803-512	1350		2-3.5 ft.	Fill	115	297
TB2	East Marine View Drive	03/31/98	EVT-9803-513	1355		5-6.5 ft.	Fill	28	222
TB2	East Marine View Drive	03/31/98	EVT-9803-514	1400		10-11.5 ft.	Fill	47	51
TB2	East Marine View Drive	03/31/98	EVT-9803-514	1400		10-11.5 ft.	Fill	47	52
TB2	East Marine View Drive	03/31/98	EVT-9803-515	1405		15-16.5 ft.	Glacial Till	502	10 U
TB2	East Marine View Drive	03/31/98	EVT-9803-516	1410		20-21.5 ft.	Glacial Till	15	10 U
TB2	East Marine View Drive	03/31/98	EVT-9803-517	1415		30-31.5 ft.	Glacial Till	10 U	10 U
TB2	East Marine View Drive	03/31/98	EVT-9803-518	1420		35-36.5 ft.	Fluvial Sand	10 U	10 U
TB3	East Marine View Drive	03/31/98	EVT-9803-501	805		2-3.5 ft.	Road Base Fill	218	158

# SUMMARY OF SAMPLES ANALYZED FOR ARSENIC AND LEAD

SITE CODE	SAMPLE SITE	SAMPLE DATE	SAMPLE NO.	SAMPLE TIME	REMARKS	SAMPLE DEPTH	SAMPLED UNIT	ANALYTICAL RESULTS	
								As (mg/kg)	Pb (mg/kg)
TB3	East Marine View Drive	03/31/98	EVT-9803-502	810		5-6.5 ft.	Glacial Till	20	31
TB3	East Marine View Drive	03/31/98	EVT-9803-503	815		10-11.5 ft.	Glacial Till	660	40
TB3	East Marine View Drive	03/31/98	EVT-9803-504	820		15-16.5 ft.	Glacial Till	194	10 U
TB3	East Marine View Drive	03/31/98	EVT-9803-505	825		20-21.5 ft.	Glacial Till	206	10 U
TB3	East Marine View Drive	03/31/98	EVT-9803-506	830		25-26.5 ft.	Glacial Till	10 U	13
TB3	East Marine View Drive	03/31/98	EVT-9803-507	835		30-31.5 ft.	Glacial Till	10 U	10 U
TB3	East Marine View Drive	03/31/98	EVT-9803-508	840	DUPLICATE	15-16.5 ft.	Glacial Till	190	10 U
TB3	East Marine View Drive	03/31/98	EVT-9803-509	920		35-36.5 ft.	Fluvial Sand	10 U	10 U
TB3	East Marine View Drive	03/31/98	EVT-9803-510	925		37.5-39 ft.	Fluvial Sand	291	10 U
TB3	East Marine View Drive	03/31/98	EVT-9803-500	8.00	WET CHEM	0-5 ft.	Road Pavement/Base Fill	18 U	20 U
TP10A	Stack Area - Flue Structure	03/20/98	EVT-9803-163	910		0-1 ft.	Fill (Loam)	473	112
TP10A	Stack Area - Flue Structure	03/20/98	EVT-9803-164	912		1-2 ft.	Smelter Debris	2460	331
TP10A	Stack Area - Flue Structure	03/20/98	EVT-9803-165	914		2-3 ft.	Smelter Debris	3571	445
TP10A	Stack Area - Flue Structure	03/20/98	EVT-9803-166	916		3-4 ft.	Smelter Debris	2399	224
TP10A	Stack Area - Flue Structure	03/20/98	EVT-9803-167	918		4-5 ft.	Smelter Debris	12491	1309
TP10A	Stack Area - Flue Structure	03/20/98	EVT-9803-168	920		5-6 ft.	Fill	2209	20
TP10B	Stack Area - Flue Structure	03/20/98	EVT-9803-156	840		0-1 ft.	Smelter Debris	866	420 J4
TP10B	Stack Area - Flue Structure	03/20/98	EVT-9803-157	842		1-2 ft.	Smelter Debris	1356	268 J4
TP10B	Stack Area - Flue Structure	03/20/98	EVT-9803-158	844		2-3 ft.	Smelter Debris	3151	284 J4
TP10B	Stack Area - Flue Structure	03/20/98	EVT-9803-159	846		3-4 ft.	Smelter Debris	3277	298 J4
TP10B	Stack Area - Flue Structure	03/20/98	EVT-9803-160	848		4-5 ft.	Smelter Debris	15433	599 J4
TP10B	Stack Area - Flue Structure	03/20/98	EVT-9803-161	850		5-6 ft.	Smelter Debris	6748	24 J4
TP10B	Stack Area - Flue Structure	03/20/98	EVT-9803-162	852	DUPLICATE	0-1 ft.	Smelter Debris	869	258 J4
TP10B-BH	Adjacent to TP10	04/06/98	EVT-9804-100	1420		5-6 ft.	Smelter Debris	1455	14
TP10B-BH	Adjacent to TP10	04/06/98	EVT-9804-101	1425		6-7 ft.	Glacial Till	453	10 U
TP10B-BH	Adjacent to TP10	04/06/98	EVT-9804-102	1430		8-9 ft.	Glacial Till	401	10 U
TP10B-BH	Adjacent to TP10	04/06/98	EVT-9804-103	1435		10-11 ft.	Glacial Till	490	10 U
TP10B-BH	Adjacent to TP10	04/06/98	EVT-9804-104	1440	DUPLICATE	10-11 ft.	Glacial Till	514	10 U
TP11A	Stack Area - Flue Structure	03/19/98	EVT-9803-151	1615		0-1 ft.	Fill (Loam)	3148	101
TP11A	Stack Area - Flue Structure	03/19/98	EVT-9803-152	1617		1-2 ft.	Smelter Debris	4692	209
TP11A	Stack Area - Flue Structure	03/19/98	EVT-9803-153	1619		2-3 ft.	Smelter Debris	12893	558
TP11A	Stack Area - Flue Structure	03/19/98	EVT-9803-154	1621		3-4 ft.	Smelter Debris	53824	186
TP11A	Stack Area - Flue Structure	03/19/98	EVT-9803-155	1623		4-5 ft.	Fill	23094	22
TP11B	Stack Area - Flue Structure	03/19/98	EVT-9803-145	1530		0-1 ft.	Fill (Loam)	1722	87
TP11B	Stack Area - Flue Structure	03/19/98	EVT-9803-146	1532		1-2 ft.	Smelter Debris	6869	267
TP11B	Stack Area - Flue Structure	03/19/98	EVT-9803-147	1534		2-3 ft.	Smelter Debris	19691	742
TP11B	Stack Area - Flue Structure	03/19/98	EVT-9803-148	1536		3-4 ft.	Smelter Debris	19937	86
TP11B	Stack Area - Flue Structure	03/19/98	EVT-9803-149	1538		4-5 ft.	Fill	36165	30
TP11B	Stack Area - Flue Structure	03/19/98	EVT-9803-150	1500		5-6 ft.	Fill	12033	20 U
TP11B	Stack Area - Flue Structure	03/19/98	EVT-9803-150	1540		5-6 ft.	Fill	11897	10 U
TP11B-BH	Adjacent to TP11	04/07/98	EVT-9804-109	820		5-6 ft.	Fill	10359	13
TP11B-BH	Adjacent to TP11	04/07/98	EVT-9804-110	825		6-7 ft.	Fill	8408	11
TP11B-BH	Adjacent to TP11	04/07/98	EVT-9804-111	830		8-9 ft.	Glacial Till	1450	10 U
TP11B-BH	Adjacent to TP11	04/07/98	EVT-9804-112	835		10-11 ft.	Glacial Till	504	10 U
TP11B-BH	Adjacent to TP11	04/07/98	EVT-9804-113	840		12-13.5 ft.	Glacial Till	212	10
TP11B-BH	Adjacent to TP11	04/07/98	EVT-9804-114	845	DUPLICATE	8-9 ft.	Glacial Till	1511	10 U
TP3	Roaster Area - Southeast Roaster	03/20/98	EVT-9803-169	1100		0-1 ft.	Fill (Loam)	1704	911
TP3	Roaster Area - Southeast Roaster	03/20/98	EVT-9803-170	1102		1-2 ft.	Smelter Debris	9043	2425
TP3	Roaster Area - Southeast Roaster	03/20/98	EVT-9803-171	1104		2-3 ft.	Smelter Debris	21686	89
TP3	Roaster Area - Southeast Roaster	03/20/98	EVT-9803-172	1106		3-4 ft.	Smelter Debris	28579	51
TP3	Roaster Area - Southeast Roaster	03/20/98	EVT-9803-173	851		4-5 ft.	Smelter Debris	1883	58
TP3	Roaster Area - Southeast Roaster	03/20/98	EVT-9803-174	1110		5-6 ft.	Smelter Debris	1259	34
TP3-BH	Adjacent to TP3	03/23/98	EVT-9803-175	1315		5-6 ft.	Smelter Debris	6902	792
TP3-BH	Adjacent to TP3	03/23/98	EVT-9803-176	1320		6-7 ft.	Smelter Debris	7084	275
TP3-BH	Adjacent to TP3	03/23/98	EVT-9803-177	1325		7-8 ft.	Glacial Till	203	13
TP3-BH	Adjacent to TP3	03/23/98	EVT-9803-178	1330		8-9 ft.	Glacial Till	507	10 U
TP3-BH	Adjacent to TP3	03/23/98	EVT-9803-179	1335		9-10 ft.	Glacial Till	655	10 U
TP3-BH	Adjacent to TP3	03/23/98	EVT-9803-180	1340		10-11 ft.	Glacial Till	744	12
TP3-BH	Adjacent to TP3	03/23/98	EVT-9803-181	1345	DUPLICATE	10-11 ft.	Glacial Till	822	10 U
TP4	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-112	1200		0-1 ft.	Fill (Loam)	565	152
TP4	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-113	1202		1-2 ft.	Smelter Debris	1981	144
TP4	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-114	1204		2-3 ft.	Smelter Debris	8799	533
TP4	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-115	1206		3-4 ft.	Smelter Debris/Fill	32918	468
TP4	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-116	1208		4-5 ft.	Fill/Glacial Till	4724	30
TP4	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-117	1210		5-6 ft.	Glacial Till	1600	16
TP4	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-118	1212	DUPLICATE	3-4 ft.	Smelter Debris/Fill	31998	544
TP4-BH	Adjacent to TP4	04/07/98	EVT-9804-120	1500		5-6 ft.	Glacial Till	631	10 U
TP4-BH	Adjacent to TP4	04/07/98	EVT-9804-121	1505		6-7 ft.	Glacial Till	225	10 U
TP4-BH	Adjacent to TP4	04/07/98	EVT-9804-122	1510		8-9 ft.	Glacial Till	219	10 U
TP4-BH	Adjacent to TP4	04/07/98	EVT-9804-123	1515		10-11 ft.	Glacial Till	206	10 U
TP5	Processing Area - Arsenic Kitchens	03/19/98	EVT-9803-126	840		0-1 ft.	Fill (Loam)	1161	473
TP5	Processing Area - Arsenic Kitchens	03/19/98	EVT-9803-127	842		1-2 ft.	Smelter Debris	5370	92
TP5	Processing Area - Arsenic Kitchens	03/19/98	EVT-9803-128	844		2-3 ft.	Fill	2777	34
TP5	Processing Area - Arsenic Kitchens	03/19/98	EVT-9803-129	846		3-4 ft.	Glacial Till	827	13
TP5	Processing Area - Arsenic Kitchens	03/19/98	EVT-9803-130	848		4-5 ft.	Glacial Till	502	10 U
TP5	Processing Area - Arsenic Kitchens	03/19/98	EVT-9803-131	850	DUPLICATE	1-2 ft.	Smelter Debris	5082	83
TP6A	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-106	1020		0-1 ft.	Smelter Debris	4373	289
TP6A	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-107	1025		1-2 ft.	Smelter Debris	12487	458
TP6A	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-108	1030		2-3 ft.	Fill	9726	38
TP6A	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-109	1035		3-4 ft.	Fill	9252	29
TP6A	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-110	1040		4-5 ft.	Glacial Till	4305	10 U
TP6A	Processing Area - Arsenic Kitchens	03/18/98	EVT-9803-111	1045		5-6 ft.	Glacial Till	3235	10 U
TP6A-BH	Adjacent to TP6A	04/07/98	EVT-9804-115	1140		5-6 ft.	Glacial Till	2335	10 U

SUMMARY OF SAMPLES ANALYZED FOR ARSENIC AND LEAD

SITE CODE	SAMPLE SITE	SAMPLE DATE	SAMPLE NO.	SAMPLE TIME	REMARKS	SAMPLE DEPTH	SAMPLED UNIT	ANALYTICAL RESULTS	
								As (mg/kg)	Pb (mg/kg)
TP6A-BH	Adjacent to TP6A	04/07/98	EVT-9804-116	1145		6-7 ft.	Glacial Till	353	10 U
TP6A-BH	Adjacent to TP6A	04/07/98	EVT-9804-117	1150		8-9 ft.	Glacial Till	706	10 U
TP6A-BH	Adjacent to TP6A	04/07/98	EVT-9804-118	1155		10-11 ft.	Glacial Till	412	10 U
TP6A-BH	Adjacent to TP6A	04/07/98	EVT-9804-119	1235		12-13 ft.	Glacial Till	249	10 U
TP6B	Processing Area - Flue Structure	03/18/98	EVT-9803-100	9:00		0-1 ft.	Smelter Debris/Loam	9576	582
TP6B	Processing Area - Flue Structure	03/18/98	EVT-9803-100	9:00		0-1 ft.	Smelter Debris/Loam	9388	544
TP6B	Processing Area - Flue Structure	03/18/98	EVT-9803-101	9:05		1-2 ft.	Smelter Debris	14223	505
TP6B	Processing Area - Flue Structure	03/18/98	EVT-9803-102	9:10		2-3 ft.	Fill	13985	10 U
TP6B	Processing Area - Flue Structure	03/18/98	EVT-9803-103	9:15		3-4 ft.	Fill	13537	14
TP6B	Processing Area - Flue Structure	03/18/98	EVT-9803-104	9:20		4-5 ft.	Glacial Till	5497	10 U
TP6B	Processing Area - Flue Structure	03/18/98	EVT-9803-105	9:25		5-6 ft.	Glacial Till	2740	10 U
TP7	Processing Area - Dust Chambers	03/19/98	EVT-9803-132	1022		0-1 ft.	Fill (Loam)	2220	523
TP7	Processing Area - Dust Chambers	03/19/98	EVT-9803-133	1024		1-2 ft.	Smelter Debris	8771	594
TP7	Processing Area - Dust Chambers	03/19/98	EVT-9803-134	1026		2-3 ft.	Smelter Debris	9935	415
TP7	Processing Area - Dust Chambers	03/19/98	EVT-9803-135	1028		3-4 ft.	Fill	10644	47
TP7	Processing Area - Dust Chambers	03/19/98	EVT-9803-136	1030		4-5 ft.	Fill	6586	10 U
TP7	Processing Area - Dust Chambers	03/19/98	EVT-9803-137	1032		5-6 ft.	Glacial Till	2952	12
TP7-BH	Adjacent to TP7	04/06/98	EVT-9804-105	1655		5-6 ft.	Glacial Till	815	10 U
TP7-BH	Adjacent to TP8	04/06/98	EVT-9804-106	1700		6-7 ft.	Glacial Till	684	10 U
TP7-BH	Adjacent to TP9	04/06/98	EVT-9804-107	1705		8-9 ft.	Glacial Till	698	10 U
TP7-BH	Adjacent to TP10	04/06/98	EVT-9804-108	1710		10-11 ft.	Glacial Till	541	10 U
TP8	Processing Area - Dust Chambers	03/19/98	EVT-9803-138	1340		0-1 ft.	Smelter Debris	3738	625
TP8	Processing Area - Dust Chambers	03/19/98	EVT-9803-139	1342		1-2 ft.	Smelter Debris	2797	415
TP8	Processing Area - Dust Chambers	03/19/98	EVT-9803-140	1344		2-3 ft.	Smelter Debris	4619	309
TP8	Processing Area - Dust Chambers	03/19/98	EVT-9803-141	1346		3-4 ft.	Smelter Debris	7237	200
TP8	Processing Area - Dust Chambers	03/19/98	EVT-9803-142	1348		4-5 ft.	Fill	4669	17
TP8	Processing Area - Dust Chambers	03/19/98	EVT-9803-143	1350		5-6 ft.	Glacial Till	564	11
TP8	Processing Area - Dust Chambers	03/19/98	EVT-9803-144	1352	DUPLICATE	1-2 ft.	Smelter Debris	2869	492
TP9	Processing Area - Dust Chambers	03/18/98	EVT-9803-119	1540		0-1 ft.	Loam Fill/Smelter Debris	33665	947
TP9	Processing Area - Dust Chambers	03/18/98	EVT-9803-120	1542		1-2 ft.	Fill	10503	795
TP9	Processing Area - Dust Chambers	03/18/98	EVT-9803-121	1544		2-3 ft.	Fill	5668	672
TP9	Processing Area - Dust Chambers	03/18/98	EVT-9803-122	1546		3-4 ft.	Fill	7821	16
TP9	Processing Area - Dust Chambers	03/18/98	EVT-9803-123	1548		4-5 ft.	Fill	1564	14
TP9	Processing Area - Dust Chambers	03/18/98	EVT-9803-124	1550		5-6 ft.	Glacial Till	535	14
TP9	Processing Area - Dust Chambers	03/18/98	EVT-9803-125	1552	DUPLICATE	1-2 ft.	Fill	12471	701

**APPENDIX D**  
**Data Validation Report**

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**DATA VALIDATION REPORT**  
**EVERETT SMELTER AREA INVESTIGATION**  
**SOIL DATA for MARCH - APRIL 1998**

Prepared by  
Hydrometrics, Inc.  
2727 Airport Road  
Helena, MT 59601

June 1998

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## **GLOSSARY OF TERMS**

CCB .....	Continuing Calibration Blank
CCV .....	Continuing Calibration Verification
CLP .....	Contract Laboratory Program
CRDL .....	Contract Required Detection Limit
EPA .....	Environmental Protection Agency
FAA .....	Flame Atomic Absorption
HF Digest .....	Hydrofluoric Acid Digestion
HGAA .....	Hydride Generation Atomic Absorption
ICB .....	Initial Calibration Blank
ICP .....	Inductively Coupled Plasma
ICP-MS .....	Inductively Coupled Plasma-Mass Spectrometry
ICV .....	Initial Calibration Verification
IDL .....	Instrument Detection Limit
LCS .....	Laboratory Control Sample
MSA .....	Method of Standard Additions
PB .....	Preparation Blank
PRDL .....	Project Required Detection Limit
QAPP .....	Quality Assurance Project Plan
QC .....	Quality Control
RAS .....	Routine Analytical Services
RPD .....	Relative Percent Difference
RSD .....	Relative Standard Deviation
SOW .....	Statement of Work
SPLP .....	Synthetic Precipitation Leaching Procedure
TDS .....	Total Dissolved Solids
XRF .....	X-ray Fluorescence

## SUMMARY

All soil samples collected for the Everett Smelter Area Investigation during March and April of 1998 have been analyzed for arsenic and lead content in the Hydrometrics' Ruston Laboratory using X-ray fluorescence (XRF). The data set has been reviewed using Hydrometrics' in-house 'AutoVal' software, which is consistent with the National Functional Guidelines for Inorganics Data Review (EPA, 1994) and which has been approved by the EPA for other XRF projects. Since soils with relatively high concentrations of lead and arsenic were the target of this investigation, and since these are parameters for which there are standards that have been well characterized by XRF analysis, the samples reviewed in this report were analyzed using a fundamental parameters calibration of the XRF instrument. The accuracy of the XRF analyses was confirmed by wet chemistry analysis of confirmation samples at a frequency of 1 in 50. Precision, accuracy, and completeness information is summarized in Section 11. The confirmation sample validation has been included in this report as Section 12.

This report also covers the validation of 2 wet chemistry data sets analyzed at Asarco's Technical Services laboratory in Salt Lake City, Utah:

- Four split samples were analyzed using synthetic precipitation leaching procedures (SPLP).
- Four soil samples could not be ground fine enough for XRF analysis in the Ruston lab and instead were analyzed using wet chemistry analysis with hydrofluoric acid digestion.

The eight samples analyzed in Salt Lake City are discussed in Section 9. Ten samples were also analyzed at a commercial laboratory, Parametrix, for bioassays. Section 10 summarizes the results on bioassays carried out with splits of 10 of the XRF samples.

Data validation codes and definitions are listed in Appendix D-1, Table 1. Appendix D-1 also contains Table 2 (Summary of Flagged Data). The validated sample database is in Appendix D-2, the confirmation sample database is in Appendix D-3, and the regression statistics for the confirmation samples are included as Appendix D-4.

**Quality control violations:**

- There were no quality control violations or omissions for the wet chemistry analyses.
- For the XRF analyses, approximately 5 percent of the measurements (34 out of 710) were flagged due to the following XRF quality control violations:
  - 3 exceedances for arsenic field duplicates resulted in a total of 14 flags.
  - 3 exceedances for lead field duplicates resulted in a total of 20 flags.

The Everett Smelter Area Investigation data analyzed in March and April of 1998 are considered to be acceptable for project purposes provided that the flagged data are considered with appropriate caution. In using the flagged data, care should be taken to note possible lack of reproducibility indicated by the flags.

**DATA VALIDATION REPORT**

<b>Prepared by:</b>	<b>Clare Bridge</b>
<b>Reviewed by:</b>	<b>Linda Tangen</b>

## DATA VALIDATION REPORT

### 1. INTRODUCTION

- This validation applies to the XRF analysis of arsenic and lead for 355 soil samples collected for the Everett Smelter Area Investigation during March and April of 1998. In addition to regular samples analyzed by XRF procedures, the total number of samples included 25 field duplicates also analyzed by XRF.
- This validation also applies to the following samples that were analyzed using traditional wet chemistry methods:
  - 4 soil samples that could not be ground fine enough for XRF analysis in the Ruston lab, and were therefore digested using hydrofluoric acid, and were then analyzed by ICP-MS.
  - 4 split samples that were handled in accordance with the EPA's Synthetic Precipitation Leaching Procedure (SPLP) and analyzed by ICP.
  - 8 confirmation samples that were digested using hydrofluoric acid, and were then analyzed by ICP-MS.
- Validation procedures used are generally consistent with:  
(Check all that apply)
  - ☒ EPA National Functional Guidelines for Inorganic Data Review
  - ☐ Work Plan:
  - ☐ Other
- Overall level of validation:
  - ☒ Contract Laboratory Program (CLP)
  - ☐ Standard
  - ☐ Visual
  - ☒ XRF Auto-Validation using in house Auto Val program

### 2. DELIVERABLES

- All laboratory document deliverables were present as specified in the CLP-Statement of Work (CLP-SOW), EPA, 1993 and/or the project contract.
  - ☒ Yes
  - ☐ No
- All documentation of field procedures was provided as required.
  - ☒ Yes
  - ☐ No

### 3. FIELD QUALITY CONTROL SAMPLES

- Field duplicates

Field duplicates have been collected at the proper frequency.

☒ Yes

☐ No

Field duplicate relative percent differences (RPDs) were within the required control limits (RPD of 35% or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within  $\pm 2$  times the PRDL for soil matrix.

☐ Yes

☒ No

The following field duplicate exceedances occurred for the samples validated in this report::

Sample Duplicate Pair	Site	Analyte	Sample Date	Sample Values mg/kg	Duplicate Values mg/kg	# Samples Flagged	RPD or $\pm$ Criteria
EVT-9803-353 & 358	SA6	Arsenic	03/20/98	3633	2208	5	49%
EVT-9803-417 & 419	SA13	Arsenic	03/25/98	227	352	4	43%
EVT-9804-347 & 377	HA3	Arsenic	04/09/98	296	187	5	45%
EVT-9803-156 & 162	TP10B	Lead	03/20/98	420	258	7	48%
EVT 9804-520 & 530	TB1	Lead	04/01/98	27	54	8	> $\pm 20$ mg/kg
EVT-9804-347 & 377	HA3	Lead	04/09/98	323	188	5	53%

Notes: A total of 34 results were flagged because the associated field duplicates were out of control limits. These flags indicate possible lack of reproducibility of due to the combined effects of variations in field sampling techniques, sample preparation, and laboratory analytical procedures.

Flagging: J<sub>4</sub>/ UJ<sub>4</sub>

### 4. LABORATORY PROCEDURES

- Laboratory procedures followed

☒ CLP-SOW

☒ SW-846

☐ Standard Methods for Chemical Analysis of Water and Wastes

☒ XRF Standard Operating Procedures

☐ Other

- **Holding times met**

☒ Yes  
☐ No

- **Analyses were carried out as requested.**

☒ Yes  
☐ No

## 5. DETECTION LIMITS

The following table lists the laboratory reporting levels by analytical method.

Analyte	Analysis Method	Reporting Level
Arsenic	XRF	10 ppm
Lead	XRF	10 ppm
Arsenic	ICP-MS	18 ppm
Lead	ICP-MS	20 ppm

- **Instrument detection limits (IDLs) were provided by the laboratories.**

☒ Yes  
☐ No

- **IDL verifications have met the CLP quarterly criteria (EPA, 1994 and 1995).**

☒ Yes  
☐ No

## 6. XRF CALIBRATION AND CALIBRATION VERIFICATIONS

- **Instrument calibrations**

All initial instrument calibrations were performed as specified in the XRF Standard Operating Procedures.

☒ Yes  
☐ No

- **Calibration verifications**

The continuing calibration verification (CCV) standards were analyzed at the required frequency.

☒ Yes  
☐ No

The CCV standard percent recovery results were within the required control limits (75-125%).

☒ Yes -- Source: NIST 2711  
☐ No

#### 7. XRF LABORATORY DUPLICATES

- Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes  
☐ No

- The laboratory duplicate relative percent differences (RPDs) were within the required control limits (RPD of 35% or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within  $\pm 2$  times the PRDL for soil matrix.

☒ Yes  
☐ No

#### 8. XRF LABORATORY CONTROL SAMPLES

- The reference material used was of the correct matrix and concentration.

☒ Yes -- Source: NIST 2711  
☐ No

- Laboratory control samples (LCSs) were prepared in the same way as the associated samples.

☒ Yes  
☐ No

- LCSs were prepared and analyzed at the proper frequency

☒ Yes  
☐ No

- LCS recoveries were within the required control limits (75-125% for arsenic and lead).

☒ Yes  
☐ No

## 9. WET CHEMISTRY ANALYSES

- SPLP samples for Arsenic**

Four samples were processed by the synthetic precipitation leaching procedure.

Sample Number	Site	Depth	Total Arsenic from XRF (ppm)	SPLP Arsenic (ppm)
EVT-9803-107-SPLP	TP6A	1-2'	12,487	7.0
EVT-9803-127-SPLP	TP5	1-2'	5,370	27.0
EVT-9803-135-SPLP	TP7	3-4'	10,644	9.1
EVT-9803-142-SPLP	TP8	4-5'	4,699	8.6

No QC violations or omissions were found for the SPLP samples. These analyses were not carried out using CLP protocols. Results were therefore not verified in the raw data. The following laboratory QC samples were checked and were found to be within control limits.

calibration verifications	laboratory duplicates
calibration blanks	laboratory matrix spikes
laboratory control samples	laboratory preparation blanks

- Soil Samples processed by hydrofluoric acid digestion**

The following 4 samples could not be ground fine enough for XRF analysis in the Hydrometrics' Ruston laboratory; they were therefore sent to Asarco's Technical Services laboratory in Salt Lake City for analysis by traditional wet chemistry methods. They were digested using the hydrofluoric acid digestion, and analyzed by ICP-MS using CLP protocol.

Sample Number	Site	Depth
EVT-9803-500	TB3	0.5-1'
EVT-9804-300	SA24	0-1'
EVT-9804-317	HA8	0.5-1'
EVT-9804-519	TB1	0-0.5'

- The samples were digested using 1 g per 200 ml and using the hydrofluoric acid digestion procedures. The digested samples were diluted by a factor of ten, and were analyzed by ICP-MS.
- The sample data were validated using CLP procedures. No QC violations or omissions were found.

## 10. BIOASSAYS

Ten samples were submitted to Parametrix, Inc. in Kirkland, WA for bioassays.

- Acute hazardous waste designation tests were carried out for 96 hours using rainbow trout.
- The bioassays were conducted at concentrations of 10 mg/L and at 100 mg/L to determine how the samples should be classified.
- Testing was done with positive and negative control groups which met all acceptable test criteria.
- None of the 10 samples caused any mortality at either concentration, and should not be designated as dangerous or extremely hazardous waste.

Sample Number	Site	Depth	Total Arsenic from XRF (ppm)
EVT-9803-129	TP5	3-4'	827
EVT-9803-113	TP-4	1-2'	1,981
EVT-9803-114	TP-4	2-3'	8,799
EVT-9803-116	TP-4	4-5'	4,724
EVT-9803-107	TP6A	1-2'	12,487
EVT-9803-132	TP7	0-1'	2,220
EVT-9803-140	TP8	2-3'	4,619
EVT-9803-143	TP8	5-6'	564
EVT-9803-122	TP9	3-4'	7,821
EVT-9803-135	TP7	3-4'	10,644

## 11. DATA QUALITY OBJECTIVES

The following accuracy and precision calculations include the XRF analyses and the 4 soil samples analyzed by regular wet chemistry. They do not include the bioassays or the SPLP analyses.

### Accuracy

The accuracy of the data is indicated by the laboratory's ability to recover a known concentration of an analyte. For the data evaluated in this report, accuracy can be measured by percent recovery on laboratory standards, the CCVs and the LCSs. All of the quality control samples were within control limits; mean recoveries are shown in the following table.

Analyte	Mean Recovery on CCVs	Mean Recovery on LCSs
Arsenic	98%	97%
Lead	99%	99%

### **Precision**

The precision of the data is indicated by the reproducibility of the results as indicated by laboratory and field duplicate samples. All of the laboratory duplicates and 88% (44 out of 50) of the field duplicates were within control limits.

The following table shows the percentage of duplicates that were within control limits broken down by parameter.

Analyte	% of Field Duplicates in Control Limits	% of Laboratory Duplicates in Control Limits
Arsenic	88%	100%
Lead	88%	100%

### **Completeness**

Completeness by parameter and by individual QC sample is detailed in Table 3.

Completeness expressed as the percent of results not rejected: 100%

Completeness expressed as the percent of results without EPA flags: 95%

## **12. CONFIRMATION SAMPLES**

### **• Introduction**

This validation applies to inorganic analytes from 8 samples in laboratory batch 98-258 for the Everett Smelter Area project during March and April of 1998. The purpose of these confirmation samples is to compare analytical results obtained by the XRF instrument with analytical results obtained from traditional wet chemistry soil analysis techniques.

### **• Detection Limits**

All analyses were done by ICP-MS. The following table lists the laboratory's reporting levels and the instrument detection limits.

Analytes	Digestion	Dilution factor for ICP-MS	IDL (ppb)	IDL times 2000 (ppm)	Reporting Level (mg/kg or ppm)
Arsenic	1g/200ml	10	0.178 ppb	0.356 ppm	18
Lead	1g/200ml	10	0.064 ppb	0.128 ppm	20

### **• Calibration And Calibration Verifications**

#### **Instrument calibrations**

All initial instrument calibrations were performed as specified in the Functional Guidelines (EPA, 1994) and/or the SOW (EPA, 1995).

  X   Yes

     No

### Calibration verifications

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were analyzed at the required frequency.

☒ Yes

☐ No

The ICV and CCV standards were analyzed at appropriate concentrations (the ICV may be at any value in the calibration range; the CCV is to be midrange, and at a different concentration than the ICV).

☒ Yes

☐ No

The ICV and CCV standard percent recovery results were within the required control limits (90-110%).

☒ Yes

☐ No

- **Laboratory CRDL Standards**

The CRDL standards were analyzed at the frequency required in the CLP-SOW (EPA, 1995).

☒ Yes

☐ No

The CRDL standards were analyzed at a concentration which demonstrates instrument linearity of response near the reporting level.

☒ Yes

☐ No

**Recovery Ranges for CRDL Standards**

Analyte	Method	Recovery Range
Arsenic	ICP-MS	102.6 - 103.0%
Lead	ICP-MS	96.5 - 106.8%

- **Laboratory Blanks**

Please note that the highest blank value associated with any particular analyte is the blank value used for the flagging process.

### Calibration blanks

The initial calibration blanks (ICBs) and the continuing calibration blanks (CCBs) were analyzed at the required frequency.

☒ Yes

☐ No

The ICB and CCB results were within the required control limits.

☒ Yes  
☐ No

**Preparation blanks**

Preparation blanks were prepared and analyzed at the required frequency.

☒ Yes  
☐ No

All the analytes in the preparation blank were less than the CRDL (or the PRDL if a project detection limit has been specified).

☒ Yes  
☐ No

• **Laboratory Matrix Spikes**

A matrix spike sample (pre-digestion) was analyzed for each digestion batch and/or matrix, or as required in the CLP-SOW.

☒ Yes  
☐ No

Samples were spiked at appropriate levels.

☒ Yes  
☐ No

Matrix spike recoveries were within the required control limits (75-125%).

☒ Yes  
☐ No

• **Laboratory Duplicates**

Laboratory duplicate samples were analyzed at the proper frequency.

☒ Yes  
☐ No

The laboratory duplicate relative percent differences (RPDs) were within the required control limits (RPD of 20% or less for water matrix, 35% or less for soil matrix). If the sample or duplicate result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the sample and the duplicate results must be within  $\pm$  the PRDL for water matrix, within  $\pm 2$  times the PRDL for soil matrix.

☒ Yes  
☐ No

• **Laboratory Control Samples**

The reference material used was of the correct matrix and concentration.

☒ Yes  
☐ No

Laboratory control samples (LCSs) were prepared in the same way as the associated samples.

☒ Yes  
☐ No

LCSs were prepared and analyzed at the proper frequency.

☒ Yes  
☐ No

LCS recoveries were within the required control limits (80-120% for water, within the certified range for soils).

☒ Yes  
☐ No

• **ICP-MS Quality Control**

The **Memory Test Solution** and **Memory Blank** were analyzed at the proper frequency, and results on the blank did not exceed the CRDL for any of the analytes.

☒ Yes  
☐ No

Intensity levels of the **Internal Standards** were monitored correctly.

☒ Yes  
☐ No

The **Interference Check Sample (ICS)** was analyzed as required in method 6020M

☒ Yes  
☐ No

**Serial dilution** samples have been analyzed at the proper frequency and the percent difference criteria have been met ( $\pm 10\%$ ) for analyte concentrations greater than 20 times the CRDL.

☒ Yes  
☐ No

• **Data Comparison (XRF Data and CLP-RAS Data)**

XRF results have been compared to corresponding CLP-RAS digested wet chemistry results (validated in this report) using the following statistical methods:

- relative percent difference
- recovery rates
- regression analysis with 95% confidence bands Miller (1992)

The source information generated for these comparisons, as well as an outlier and completeness evaluation, are in Appendix D-2.

**Relative Percent Difference:**

The data pairs (XRF vs wet chemistry) have been compared using the following criteria: relative percent difference (RPD) values were calculated for samples with concentrations greater than 5 times the PRDL. A control limit of 35% RPD was used for the comparison. If either the XRF or wet chemistry result is less than 5 times the PRDL, the RPD criteria are not used. In these cases, the difference between the XRF and wet chemistry result should be within  $\pm 2$  times the PRDL for soil matrix. These criteria are typically used for the comparison of laboratory duplicates. The RPD/PRDL duplicate criteria are used here to evaluate the agreement of the XRF confirmation sample data pairs relative to generally accepted control limits; however, no data are qualified as a result of the comparison (summarized in the following table).

Parameter	Type of Comparison	# of Data Pairs	# of Data Pairs in Control Limits	% within Control Limits
Arsenic	RPD	4	4	100
Arsenic	<5xPRDL	4	4	100
Arsenic	Combined	8	8	100
Lead	RPD	4	4	100
Lead	<5xPRDL	4	4	100
Lead	Combined	8	8	100

**Recovery rate:**

Recovery rate (percent) is calculated as (XRF value/HF digest value) x 100. To determine whether one analytical method consistently gives higher or lower concentrations than the other, the frequency of recoveries which are >100% (XRF result higher than wet chemistry result) is compared to those which are <100% (XRF result lower than wet chemistry result).

**Recovery rates for arsenic:**

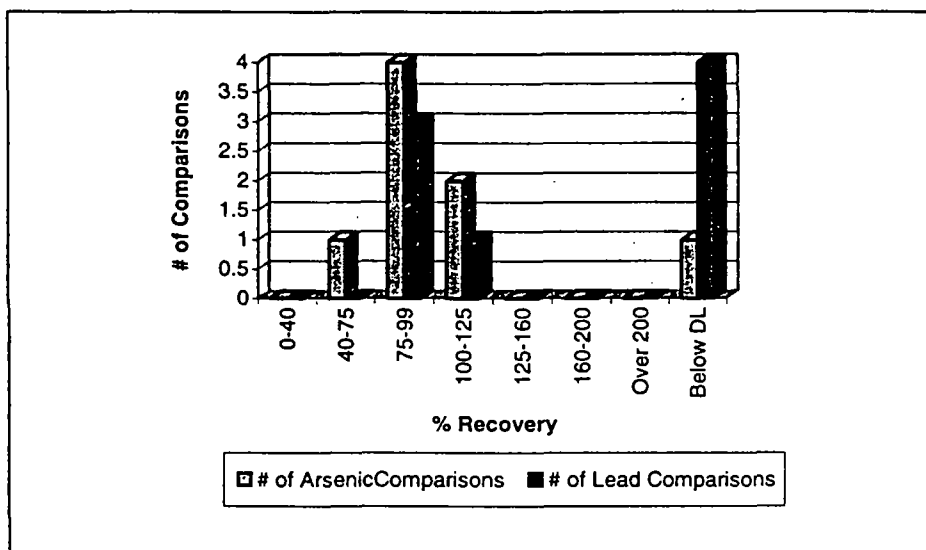
XRF concentrations were equal to or higher than wet chemistry results 25% (2 of 8) of the time and lower 62.5% (5 of 8) of the time. One or both of the values were below the reporting detection limit 12.5% (1 of 8) of the time. For 86% (6 of 7) of the data pairs where both of the values were above the detection limit, the recoveries were between 75 - 125%.

**Recovery rates for lead:**

XRF concentrations were higher than wet chemistry results 12.5% (1 of 8) of the time and lower 37.5% (3 of 8) of the time. One or both of the values were below the reporting detection limit 50% (4 of 8) of the time. In the 4 cases where recoveries were calculated, all were between 75-125%.

The following graph presents the recovery rate distribution for both arsenic and lead:

**Recovery Rates**



Recovery Range	# of Arsenic Comparisons	% of Arsenic Comparisons	# of Lead Comparisons	% of Lead Comparisons
0-40	0	0	0	0
40-75	1	12.5	0	0
75-99	4	50	3	37.5
100-125	2	25	1	12.5
125-160	0	0	0	0
160-200	0	0	0	0
Over 200	0	0	0	0
Below DL	1	12.5	4	50

Shaded area represents "ideal" range.

**Regression analysis:**

The *R-value* determines the strength of the association between variables. Perfect correlation between variables (i.e. perfect agreement between XRF and wet chemistry concentrations) would be indicated by an *R-value* of 1.0.

The *slope of the regression line* should be near one for methods giving similar results, and may show if a systematic error in calibration plots has occurred during analysis.

The *Y-intercept* should be near zero for methods giving similar results, and may show if a systematic error has been introduced by background interference, whether it be absorption or fluorescence factors.

**Arsenic Regression:            R = 0.99997**

Slope	y - Intercept
Upper 95%: 0.991	Upper 95%: 22.56
Value: 0.986	Value: -4.86
Lower 95%: 0.981	Lower 95%: -32.27

- The R-value is very close to one, showing a high correlation between the two analysis methods.
- The value of the slope is fairly close to one, showing little evidence of systematic error due to calibration.
- The 95% confidence limits for the y-intercept encompass the ideal value of zero, with a relatively equal spread in the positive and negative directions. This shows that any systematic error introduced by background interference is small, although there may be a slight negative bias.

This information and further inspection of the scatter plot of the data (Appendix D-2) indicate that arsenic results from the two different analysis methods are in excellent agreement over the concentration range of the samples measured (18 to 12,000 mg/kg).

**Lead Regression:            R = 0.99937**

Slope	y - Intercept
Upper 95%: 1.026	Upper 95%: 2.56
Value: 0.991	Value: -11.47
Lower 95%: 0.956	Lower 95%: -25.51

- The R-value is very close to one, showing a high correlation between the two analysis methods.
- The value of the slope is very close to one, showing no evidence of systematic error due to calibration.

- The 95% confidence limits for the y-intercept encompass the ideal value of zero. The spread, however, is biased in the negative direction. This shows that a small systematic error may have been introduced by background interference.

This information and further inspection of the scatter plot of the data (Appendix D-2) indicate that lead results from the two different analysis methods are in excellent agreement over the concentration range of the samples measured (20 to 950 mg/kg).

Graphs and supporting data for each parameter are contained in Appendix D-2.

- **Data quality objectives**

**Accuracy** is a measure of the laboratory's ability to recover a known true value of analyte. Here, accuracy has been evaluated by performance on the laboratory control standard (LCS) and on the laboratory matrix spike.

**Accuracy As Demonstrated by Laboratory Control Sample Analyses**

Parameter	Method	% Recovery	# of LCSs
Arsenic	ICP-MS	92 %	1
Lead	ICP-MS	96 %	1

**Accuracy As Demonstrated by Laboratory Matrix Spike Analyses**

Parameter	Method	% Recovery	# of Matrix Spikes
Arsenic	ICP-MS	*	1
Lead	ICP-MS	99 %	1

\* The sample concentration exceeded the spike concentration by more than a factor of four, so (following accepted laboratory procedures) the spike recovery was not calculated.

**Precision** is a measure of the reproducibility of results. Precision is evaluated by performance on the laboratory duplicate samples.

**Precision As Demonstrated By Laboratory Duplicate Analyses**

Parameter	Method	Average % RPD	# of Laboratory Duplicates
Arsenic	ICP-MS	1.2	1
Lead	ICP-MS	0.8	1

**Completeness**

Completeness expressed as the percent of results not rejected: 100%

Completeness expressed as the percent of results without EPA flags: 100%

## **APPENDIX D-1**

### **Tables**

**TABLE 1.**

**DATA VALIDATION CODES AND DEFINITIONS**

<u>CODE</u>	<u>DEFINITION</u>
J -	<p>The associated numerical value is an estimated quantity because quality control criteria were not met.</p> <p>Subscripts for the "J" qualifier:</p> <ul style="list-style-type: none"><li>2 - Calibration range exceeded or significant deviation from known value. Possible bias.</li><li>3 - Holding time not met. Indicates low bias.</li><li>4 - Other QC outside control limits.</li><li>5 - Quality control sample was omitted. (Not an EPA code.)</li></ul>
UJ -	<p>The material was analyzed for, but was not detected above the associated value.</p> <ul style="list-style-type: none"><li>1 Blank contamination. Indicates possible high bias and/or false positive.</li><li>2 - Calibration range exceeded or significant deviation from known value. Possible bias.</li><li>3 - Holding time not met. Indicates low bias.</li><li>4 - Other QC outside control limits.</li><li>5 - Quality control sample was omitted. (Not an EPA code.)</li></ul>
R -	<p>Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.</p>
A -	<p>Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code.)</p>

**Table 2. Summary of Flagged Data**  
**Everett Smelter Area Investigation, March-April 1998**

Site	Sample No	Depth	Date	Parameter	Result	Flag	Reason for Flag
TP10B	EVT-9803-156	0-1'	03/20/98	LEAD (PB)(TOT)	420	J4	Field duplicate RPD=48%
TP10B	EVT-9803-157	1-2'	03/20/98	LEAD (PB)(TOT)	268	J4	Field duplicate RPD=48%
TP10B	EVT-9803-158	2-3'	03/20/98	LEAD (PB)(TOT)	284	J4	Field duplicate RPD=48%
TP10B	EVT-9803-159	3-4'	03/20/98	LEAD (PB)(TOT)	298	J4	Field duplicate RPD=48%
TP10B	EVT-9803-160	4-5'	03/20/98	LEAD (PB)(TOT)	599	J4	Field duplicate RPD=48%
TP10B	EVT-9803-161	5-6'	03/20/98	LEAD (PB)(TOT)	24	J4	Field duplicate RPD=48%
TP10B (Dup)	EVT-9803-162	0-1'	03/20/98	LEAD (PB)(TOT)	258	J4	Field duplicate RPD=48%
SA6	EVT-9803-353	0-1'	03/20/98	ARSENIC (AS)(TOT)	3633	J4	Field duplicate RPD=49%
SA6 (Dup)	EVT-9803-358	0-1'	03/20/98	ARSENIC (AS)(TOT)	2208	J4	Field duplicate RPD=49%
SA6	EVT-9803-359	4-5'	03/20/98	ARSENIC (AS)(TOT)	7903	J4	Field duplicate RPD=49%
SA6	EVT-9803-360	5-6'	03/20/98	ARSENIC (AS)(TOT)	1260	J4	Field duplicate RPD=49%
SA6	EVT-9803-361	7.5-9'	03/20/98	ARSENIC (AS)(TOT)	2761	J4	Field duplicate RPD=49%
SA13	EVT-9803-416	2-3'	03/25/98	ARSENIC (AS)(TOT)	13	J4	Field duplicate RPD=43%
SA13	EVT-9803-417	3-4'	03/25/98	ARSENIC (AS)(TOT)	227	J4	Field duplicate RPD=43%
SA13	EVT-9803-418	4-5'	03/25/98	ARSENIC (AS)(TOT)	42	J4	Field duplicate RPD=43%
SA13 (Dup)	EVT-9803-419	3-4'	03/25/98	ARSENIC (AS)(TOT)	352	J4	Field duplicate RPD=43%
HA3	EVT-9804-345	0-6"	04/09/98	ARSENIC (AS)(TOT) LEAD (PB)(TOT)	16 686	J4 J4	Field duplicate RPD=45% Field duplicate RPD=53%
HA3	EVT-9804-346	6"-1'	04/09/98	ARSENIC (AS)(TOT) LEAD (PB)(TOT)	16 1049	J4 J4	Field duplicate RPD=45% Field duplicate RPD=53%
HA3	EVT-9804-347	2-2.5'	04/09/98	ARSENIC (AS)(TOT) LEAD (PB)(TOT)	296 323	J4 J4	Field duplicate RPD=45% Field duplicate RPD=53%
HA3	EVT-9804-348	4-4.5'	04/09/98	ARSENIC (AS)(TOT) LEAD (PB)(TOT)	389 758	J4 J4	Field duplicate RPD=45% Field duplicate RPD=53%
HA3 (Dup)	EVT-9804-377	2-2.5'	04/09/98	ARSENIC (AS)(TOT) LEAD (PB)(TOT)	187 188	J4 J4	Field duplicate RPD=45% Field duplicate RPD=53%
TB1	EVT-9804-520	2-3.5'	04/01/98	LEAD (PB)(TOT)	27	J4	Field duplicate difference > $\pm 2$ times PRDL
TB1	EVT-9804-522	10-11.5'	04/01/98	LEAD (PB)(TOT)	63	J4	Field duplicate difference > $\pm 2$ times PRDL
TB1	EVT-9804-523	15-16.5'	04/01/98	LEAD (PB)(TOT)	13	J4	Field duplicate difference > $\pm 2$ times PRDL
TB1	EVT-9804-524	20-21.5'	04/01/98	LEAD (PB)(TOT)	12	J4	Field duplicate difference > $\pm 2$ times PRDL
TB1	EVT-9804-525	25-26.5'	04/01/98	LEAD (PB)(TOT)	< 10	UJ4	Field duplicate difference > $\pm 2$ times PRDL
TB1	EVT-9804-526	30-31.5'	04/01/98	LEAD (PB)(TOT)	< 10	UJ4	Field duplicate difference > $\pm 2$ times PRDL
TB1	EVT-9804-527	35-36.5'	04/01/98	LEAD (PB)(TOT)	< 10	UJ4	Field duplicate difference > $\pm 2$ times PRDL
TB1 (Dup)	EVT-9804-530	2-3.5'	04/01/98	LEAD (PB)(TOT)	54	J4	Field duplicate difference > $\pm 2$ times PRDL

## **APPENDIX D-2**

### **Sample Database**

**Note:**

- **Lab numbers starting with 98R are for XRF analyses.**
- **Lab numbers starting with 258 are for HF digest wet chemistry analyses.**
- **Lab numbers starting with L98 are for SPLP wet chemistry analyses analyses.**

## TABLE OF CONTENTS BY SITE TYPE

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	HA1	HAND AUGER NEAR OVERPASS	Soil		
2	HA2	HAND AUGER NEAR OVERPASS	Soil		
3	HA3	HAND AUGER NEAR OVERPASS	Soil		
4	HA4	HAND AUGER NEAR OVERPASS	Soil		
5	HA5	HAND AUGER NEAR OVERPASS	Soil		
6	HA6	HAND AUGER NEAR OVERPASS	Soil		
7	HA7	HAND AUGER NEAR OVERPASS	Soil		
8	HA8	HAND AUGER NEAR OVERPASS	Soil		
9	HA9	HAND AUGER NEAR OVERPASS	Soil		
10	HA10	HAND AUGER NEAR OVERPASS	Soil		
11	HA11	HAND AUGER NEAR OVERPASS	Soil		
12	HA12	HAND AUGER NEAR OVERPASS	Soil		
13	HA13	HAND AUGER NEAR OVERPASS	Soil		
14	HA14	HAND AUGER NEAR OVERPASS	Soil		
15	HA15	HAND AUGER NEAR OVERPASS	Soil		
16	HA16	HAND AUGER NEAR OVERPASS	Soil		
17	SA1	SOIL BORING	Soil		
18	SA2	SOIL BORING	Soil		
20	SA3	SOIL BORING	Soil		
21	SA4	SOIL BORING	Soil		
23	SA5	SOIL BORING	Soil		
25	SA6	SOIL BORING	Soil		
27	SA7	SOIL BORING	Soil		
29	SA8	SOIL BORING	Soil		
30	SA9	SOIL BORING	Soil		
31	SA10	SOIL BORING	Soil		
32	SA11	SOIL BORING	Soil		
33	SA12	SOIL BORING	Soil		
34	SA13	SOIL BORING	Soil		
35	SA14	SOIL BORING	Soil		
36	SA15	SOIL BORING	Soil		
37	SA16	SOIL BORING	Soil		
38	SA17	SOIL BORING	Soil		
39	SA18	SOIL BORING	Soil		
40	SA19	SOIL BORING	Soil		
41	SA20	SOIL BORING	Soil		
42	SA21	SOIL BORING	Soil		
43	SA22	SOIL BORING	Soil		
45	SA23	SOIL BORING	Soil		
46	SA24	SOIL BORING	Soil		
47	SA25	SOIL BORING	Soil		
48	SA26	SOIL BORING	Soil		
49	SOUTHERN-CLEAF	SURFACE SAMPLES	Soil		
50	TB1	TILL BORING	Soil		
52	TB2	TILL BORING	Soil		
54	TB3	TILL BORING	Soil		
56	TP3	TEST PIT	Soil		
57	TP3-BH	BORING BY TP3	Soil		
59	TP4	TEST PIT	Soil		
61	TP4-BH	BORING BY TP4	Soil		
62	TP5	TEST PIT	Soil		
64	TP6A	TEST PIT	Soil		
66	TP6A-BH	BORING BY TP6A	Soil		
67	TP6B	TEST PIT	Soil		
69	TP7	TEST PIT	Soil		
71	TP7-BH	BORING BY TP7	Soil		
72	TP8	TEST PIT	Soil		
74	TP9	TEST PIT	Soil		
76	TP10A	TEST PIT	Soil		
77	TP10B	TEST PIT	Soil		
79	TP10B-BH	BORING BY TP10B	Soil		
80	TP11A	TEST PIT	Soil		
81	TP11B	TEST PIT	Soil		
83	TP11B-BH	BORING BY TP11B	Soil		

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA1	HA1	HA1	HA1
SAMPLE DATE	04/08/98	04/08/98	04/08/98	04/08/98
SAMPLE TIME	14:50	14:55	15:00	15:05
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01199	98R-01200	98R-01201	98R-01202
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-329	EVT-9804-330	EVT-9804-331	EVT-9804-332

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	91.0	159.0	< 10.0	< 10.0
LEAD (PB) TOT	1221.0	3582.0	11.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA2	HA2	HA2	HA2
SAMPLE DATE	04/09/98	04/09/98	04/09/98	04/09/98
SAMPLE TIME	14:30	14:35	14:40	14:45
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01242	98R-01243	98R-01244	98R-01245
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-373	EVT-9804-374	EVT-9804-375	EVT-9804-376

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	11.0	11.0	21.0	52.0
LEAD (PB) TOT	1003.0	539.0	331.0	219.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA3	HA3	HA3	HA3	HA3
SAMPLE DATE	04/09/98	04/09/98	04/09/98	04/09/98	04/09/98
SAMPLE TIME	9:05	9:10	9:15	9:20	14:02
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01215	98R-01216	98R-01217	98R-01218	98R-01246
REMARKS					DUPLICATE
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'	2-2.5'
SAMPLE NUMBER	EVT-9804-345	EVT-9804-346	EVT-9804-347	EVT-9804-348	EVT-9804-377

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	16.0	J4	16.0	J4	296.0	J4	389.0	J4	187.0	J4
LEAD (PB) TOT	686.0	J4	1049.0	J4	323.0	J4	758.0	J4	188.0	J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA4	HA4	HA4	HA4
SAMPLE DATE	04/08/98	04/08/98	04/08/98	04/08/98
SAMPLE TIME	11:35	11:40	11:45	11:50
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01182	98R-01183	98R-01184	98R-01185
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-312	EVT-9804-313	EVT-9804-314	EVT-9804-315

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	30.0	20.0	< 10.0	< 10.0
LEAD (PB) TOT	925.0	338.0	59.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HAS	HAS	HAS	HAS
SAMPLE DATE	04/08/98	04/08/98	04/08/98	04/08/98
SAMPLE TIME	15:10	15:15	15:20	15:25
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01203	98R-01204	98R-01205	98R-01206
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-333	EVT-9804-334	EVT-9804-335	EVT-9804-336

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	< 10.0	< 10.0	< 10.0	< 10.0
LEAD (PB) TOT	14.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA6	HA6	HA6	HA6
SAMPLE DATE	04/09/98	04/09/98	04/09/98	04/09/98
SAMPLE TIME	14:10	14:15	14:20	14:25
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01238	98R-01239	98R-01240	98R-01241
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-369	EVT-9804-370	EVT-9804-371	EVT-9804-372

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	11.0	< 10.0	< 10.0	< 10.0
LEAD (PB) TOT	738.0	160.0	13.0	166.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA7	HA7	HA7
SAMPLE DATE	04/09/98	04/09/98	04/09/98
SAMPLE TIME	9:30	9:35	9:40
LAB	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01219	98R-01220	98R-01221
DEPTH	0-6"	6"-1'	2-2.5'
SAMPLE NUMBER	EVT-9804-349	EVT-9804-350	EVT-9804-351

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	15.0	15.0	21.0
LEAD (PB) TOT	295.0	276.0	351.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA8	HA8	HA8	HA8
SAMPLE DATE	04/08/98	04/08/98	04/08/98	04/08/98
SAMPLE TIME	11:55	:	12:05	12:10
LAB	RUSTON	TSC-SLC	RUSTON	RUSTON
LAB NUMBER	98R-01186	258-3732	98R-01188	98R-01189
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-316	EVT-9804-317	EVT-9804-318	EVT-9804-319

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	20.0	<18.0	< 10.0	< 10.0
LEAD (PB) TOT	755.0	<20.0	190.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA9	HA9	HA9	HA9
SAMPLE DATE	04/08/98	04/08/98	04/08/98	04/08/98
SAMPLE TIME	15:30	15:35	15:40	15:45
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01207	98R-01208	98R-01209	98R-01210
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-337	EVT-9804-338	EVT-9804-339	EVT-9804-340

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	< 10.0	< 10.0	< 10.0	< 10.0
LEAD (PB) TOT	21.0	21.0	23.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA10	HA10	HA10	HA10	HA10
SAMPLE DATE	04/09/98	04/09/98	04/09/98	04/09/98	04/09/98
SAMPLE TIME	13:45	13:50	13:55	14:00	15:02
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01234	98R-01235	98R-01236	98R-01237	98R-01247
REMARKS					DUPLICATE
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'	2-2.5'
SAMPLE NUMBER	EVT-9804-365	EVT-9804-366	EVT-9804-367	EVT-9804-368	EVT-9804-378

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	22.0	< 10.0	< 10.0	349.0	< 10.0
LEAD (PB) TOT	793.0	174.0	80.0	1039.0	58.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (PLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA11	HA11	HA11	HA11	HA11
SAMPLE DATE	04/09/98	04/09/98	04/09/98	04/09/98	04/09/98
SAMPLE TIME	9:50	9:55	10:00	10:50	10:05
LAB	RUSTON	RUSTON	RUSTON	TSC-SLC	RUSTON
LAB NUMBER	98R-01222	98R-01223	98R-01224	258-3728	98R-01225
TYPE				HP	
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-353	EVT-9804-354	EVT-9804-355	EVT-9804-356	EVT-9804-356

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	< 10.0	25.0	< 10.0	31.0	20.0
LEAD (PB) TOT	852.0	688.0	27.0	210.0	183.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA12	HA12	HA12	HA12
SAMPLE DATE	04/08/98	04/08/98	04/08/98	04/08/98
SAMPLE TIME	12:15	12:20	12:25	12:30
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01190	98R-01191	98R-01192	98R-01193
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-320	EVT-9804-321	EVT-9804-322	EVT-9804-323

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	21.0	< 10.0	215.0	< 10.0
LEAD (PB) TOT	1086.0	181.0	7186.0	13.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested  
Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;  
R: Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA14	HA14	HA14	HA14
SAMPLE DATE	04/09/98	04/09/98	04/09/98	04/09/98
SAMPLE TIME	13:20	13:25	13:30	13:35
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01230	98R-01231	98R-01232	98R-01233
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-361	EVT-9804-362	EVT-9804-363	EVT-9804-364

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	12.0	20.0	< 10.0	45.0
LEAD (PB) TOT	663.0	62.0	< 10.0	40.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA15	HA15	HA15	HA15
SAMPLE DATE	04/09/98	04/09/98	04/09/98	04/09/98
SAMPLE TIME	10:40	10:45	10:50	10:55
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01226	98R-01227	98R-01228	98R-01229
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'
SAMPLE NUMBER	EVT-9804-357	EVT-9804-358	EVT-9804-359	EVT-9804-360

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	17.0	32.0	12.0	< 10.0
LEAD (PB) TOT	780.0	1439.0	56.0	1236.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	HA16	HA16	HA16	HA16	HA16
SAMPLE DATE	04/08/98	04/08/98	04/08/98	04/08/98	04/08/98
SAMPLE TIME	13:40	13:45	13:50	13:55	14:00
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01194	98R-01195	98R-01196	98R-01197	98R-01198
REMARKS					DUPLICATE
DEPTH	0-6"	6"-1'	2-2.5'	4-4.5'	2-2.5'
SAMPLE NUMBER	EVT-9804-324	EVT-9804-325	EVT-9804-326	EVT-9804-327	EVT-9804-328

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	19.0	32.0	< 10.0	19.0	< 10.0
LEAD (PB) TOT	641.0	625.0	16.0	15.0	30.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA1	SA1	SA1	SA1	SA1	SA1
SAMPLE DATE	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98
SAMPLE TIME	15:30	15:35	15:40	15:45	15:50	15:55
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00952	98R-00953	98R-00954	98R-00955	98R-00956	98R-00957
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	6-6.25'
SAMPLE NUMBER	EVT-9803-363	EVT-9803-364	EVT-9803-365	EVT-9803-366	EVT-9803-367	EVT-9803-368

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1427.0	682.0	818.0	320.0	3841.0	515.0
LEAD (PB) TOT	1038.0	387.0	89.0	17.0	1083.0	77.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA2	SA2	SA2	SA2	SA2	SA2
SAMPLE DATE	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98
SAMPLE TIME	8:20	8:25	8:30	8:35	8:40	8:45
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00958	98R-00959	98R-00960	98R-00961	98R-00962	98R-00963
DEPTH	0-1'	1-2'	2-3'	3-4'	5-6'	6-7'
SAMPLE NUMBER	EVT-9803-369	EVT-9803-370	EVT-9803-371	EVT-9803-372	EVT-9803-373	EVT-9803-374

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	2351.0	4171.0	2014.0	158.0	40.0	17.0
LEAD (PB) TOT	1141.0	1128.0	< 10.0	< 10.0	11.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SA2
SAMPLE DATE	03/23/98
SAMPLE TIME	8:50
LAB	RUSTON
LAB NUMBER	98R-00964
REMARKS	DUPLICATE
DEPTH	3-4'
SAMPLE NUMBER	EVT-9803-375

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	125.0
LEAD (PB) TOT	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SAJ	SAJ	SAJ	SAJ
SAMPLE DATE	03/26/98	03/26/98	03/26/98	03/26/98
SAMPLE TIME	9:10	9:15	9:20	9:25
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01028	98R-01029	98R-01030	98R-01031
DEPTH	0-1'	1-2'	2-3'	3-4'
SAMPLE NUMBER	EVT-9803-431	EVT-9803-432	EVT-9803-433	EVT-9803-434

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	13.0	21.0	21.0	< 10.0
LEAD (PB) TOT	1315.0	118.0	106.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (PLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA4	SA4	SA4	SA4	SA4	SA4
SAMPLE DATE	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98
SAMPLE TIME	8:00	8:05	8:10	8:15	8:20	8:25
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00980	98R-00981	98R-00982	98R-00983	98R-00984	98R-00985
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	5-6'
SAMPLE NUMBER	EVT-9803-391	EVT-9803-392	EVT-9803-393	EVT-9803-394	EVT-9803-395	EVT-9803-396

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	11792.0	2618.0	13.0	26.0	14.0	< 10.0
LEAD (PB) TOT	12116.0	530.0	22.0	14.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SA4
SAMPLE DATE	03/25/98
SAMPLE TIME	8:30
LAB	RUSTON
LAB NUMBER	98R-00986
REMARKS	DUPLICATE
DEPTH	4-5'
SAMPLE NUMBER	EVT-9803-397

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	< 10.0
LEAD (PB) TOT	12.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA5	SA5	SA5	SA5	SA5	SA5
SAMPLE DATE	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98
SAMPLE TIME	10:50	10:15	10:20	10:25	10:30	10:35
LAB	TSC-SLC	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	258-3724	98R-00965	98R-00966	98R-00967	98R-00968	98R-00969
TYPE	HP					
DEPTH	0-1'	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-376	EVT-9803-376	EVT-9803-377	EVT-9803-378	EVT-9803-379	EVT-9803-380

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	4750.0	4677.0	808.0	47.0	60.0	11.0
LEAD (PB) TOT	947.0	942.0	115.0	14.0	14.0	15.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested  
Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;  
R: Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SAS	SAS	SAS	SAS
SAMPLE DATE	03/23/98	03/23/98	03/23/98	03/23/98
SAMPLE TIME	10:40	10:45	10:50	10:55
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00970	98R-00971	98R-00972	98R-00973
DEPTH	5-6'	8-9'	11-12'	14-15'
SAMPLE NUMBER	EVT-9803-381	EVT-9803-382	EVT-9803-383	EVT-9803-384

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	35.0	317.0	280.0	61.0
LEAD (PB) TOT	17.0	< 10.0	< 10.0	13.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA6	SA6	SA6	SA6	SA6	SA6
SAMPLE DATE	03/20/98	03/20/98	03/20/98	03/20/98	03/20/98	03/20/98
SAMPLE TIME	9:40	9:45	10:30	10:35	11:00	13:50
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00908	98R-00909	98R-00911	98R-00912	98R-00913	98R-00914
REMARKS					DUPLICATE	
DEPTH	0-1'	1-2'	2-3'	3-4'	0-1'	4-5'
SAMPLE NUMBER	EVT-9803-353	EVT-9803-354	EVT-9803-356	EVT-9803-357	EVT-9803-358	EVT-9803-359

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	3633.0	J4	39777.0	40938.0	33201.0	2208.0	J4	7903.0	J4
LEAD (PB) TOT	304.0		1327.0	41.0	20.0	215.0		10.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA6	SA6
SAMPLE DATE	03/20/98	03/20/98
SAMPLE TIME	13:55	14:25
LAB	RUSTON	RUSTON
LAB NUMBER	98R-00915	98R-00916
DEPTH	5-6'	7.5-9'
SAMPLE NUMBER	EVT-9803-360	EVT-9803-361

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1260.0	J4	2761.0	J4
LEAD (PB) TOT	< 10.0		< 10.0	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA7	SA7	SA7
SAMPLE DATE	03/19/98	03/19/98	03/19/98
SAMPLE TIME	14:37	16:00	16:10
LAB	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00905	98R-00906	98R-00907
REMARKS	DUPLICATE		
DEPTH	5-6'	7.5-9'	10-11'
SAMPLE NUMBER	EVT-9803-350	EVT-9803-351	EVT-9803-352

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1050.0	402.0	258.0
LEAD (PB) TOT	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA8	SA8	SA8	SA8	SA8
SAMPLE DATE	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98
SAMPLE TIME	13:40	13:45	14:05	14:10	14:20
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00864	98R-00865	98R-00866	98R-00867	98R-00868
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-305	EVT-9803-306	EVT-9803-307	EVT-9803-308	EVT-9803-309

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1208.0	111.0	79.0	42.0	52.0
LEAD (PB) TOT	199.0	12.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA10	SA10	SA10	SA10	SA10	SA10
SAMPLE DATE	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98
SAMPLE TIME	9:55	10:00	10:05	10:10	10:12	10:15
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00888	98R-00889	98R-00890	98R-00891	98R-00892	98R-00893
REMARKS					DUPLICATE	
DEPTH	0-1'	1-2'	2-3'	3-4'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-325B	EVT-9803-326	EVT-9803-327	EVT-9803-328	EVT-9803-329	EVT-9803-330

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	312.0	< 10.0	70.0	< 10.0	< 10.0	14.0
LEAD (PB) TOT	113.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA12	SA12	SA12	SA12	SA12
SAMPLE DATE	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98
SAMPLE TIME	10:55	11:00	11:05	11:10	11:15
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00894	98R-00895	98R-00896	98R-00897	98R-00898
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-339	EVT-9803-340	EVT-9803-341	EVT-9803-342	EVT-9803-343

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	968.0	125.0	14.0	< 10.0	< 10.0
LEAD (PB) TOT	604.0	52.0	11.0	< 10.0	13.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA13	SA13	SA13	SA13	SA13	SA13
SAMPLE DATE	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98
SAMPLE TIME	14:30	14:35	14:40	14:45	14:50	15:00
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01003	98R-01004	98R-01005	98R-01006	98R-01007	98R-01008
REMARKS						DUPLICATE
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	3-4'
SAMPLE NUMBER	EVT-9803-414	EVT-9803-415	EVT-9803-416	EVT-9803-417	EVT-9803-418	EVT-9803-419

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	846.0	1024.0	13.0 J4	227.0 J4	42.0 J4	352.0 J4
LEAD (PB) TOT	281.0	212.0	12.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA14	SA14	SA14	SA14	SA14	SA14
SAMPLE DATE	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98
SAMPLE TIME	16:40	16:45	16:50	16:55	17:00	17:05
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00974	98R-00975	98R-00976	98R-00977	98R-00978	98R-00979
REMARKS						DUPLICATE
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	0-1'
SAMPLE NUMBER	EVT-9803-385	EVT-9803-386	EVT-9803-387	EVT-9803-388	EVT-9803-389	EVT-9803-390

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	11.0	< 10.0	< 10.0	< 10.0	< 10.0	10.0
LEAD (PB) TOT	< 10.0	< 10.0	13.0	10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA15	SA15	SA15	SA15	SA15
SAMPLE DATE	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98
SAMPLE TIME	9:40	9:45	9:50	9:55	10:00
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00987	98R-00988	98R-00989	98R-00990	98R-00991
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-398	EVT-9803-399	EVT-9803-400	EVT-9803-401	EVT-9803-402

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	113.0	< 10.0	< 10.0	< 10.0	< 10.0
LEAD (PB) TOT	35.0	11.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA16	SA16	SA16	SA16	SA16	SA16
SAMPLE DATE	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98
SAMPLE TIME	11:35	11:40	11:45	11:50	11:55	12:00
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00997	98R-00998	98R-00999	98R-01000	98R-01001	98R-01002
REMARKS						DUPLICATE
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	2-3'
SAMPLE NUMBER	EVT-9803-408	EVT-9803-409	EVT-9803-410	EVT-9803-411	EVT-9803-412	EVT-9803-413

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	405.0	51.0	166.0	< 10.0	< 10.0	232.0
LEAD (PB) TOT	22.0	< 10.0	23.0	< 10.0	< 10.0	41.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA17	SA17	SA17	SA17	SA17
SAMPLE DATE	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98
SAMPLE TIME	10:30	10:35	10:40	10:45	10:50
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00992	98R-00993	98R-00994	98R-00995	98R-00996
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-403	EVT-9803-404	EVT-9803-405	EVT-9803-406	EVT-9803-407

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	811.0	610.0	< 10.0	< 10.0	< 10.0
LEAD (PB) TOT	239.0	103.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA18	SA18	SA18	SA18	SA18	SA18
SAMPLE DATE	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98	03/25/98
SAMPLE TIME	15:30	15:35	15:40	15:45	15:00	15:50
LAB	RUSTON	RUSTON	RUSTON	RUSTON	TSC-SLC	RUSTON
LAB NUMBER	98R-01009	98R-01010	98R-01011	98R-01012	258-3725	98R-01013
TYPE					HF	
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	4-5'
SAMPLE NUMBER	EVT-9803-420	EVT-9803-421	EVT-9803-422	EVT-9803-423	EVT-9803-424	EVT-9803-424

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1798.0	288.0	18.0	< 10.0	<18.0	13.0
LEAD (PB) TOT	713.0	< 10.0	< 10.0	< 10.0	<20.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA19	SA19	SA19	SA19	SA19
SAMPLE DATE	03/30/98	03/30/98	03/30/98	03/30/98	03/30/98
SAMPLE TIME	16:10	16:15	16:20	16:25	16:30
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01092	98R-01093	98R-01094	98R-01095	98R-01096
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-453	EVT-9803-454	EVT-9803-455	EVT-9803-457	EVT-9803-458

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	44.0	< 10.0	< 10.0	< 10.0	< 10.0
LEAD (PB) TOT	84.0	11.0	12.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA20	SA20	SA20	SA20	SA20
SAMPLE DATE	03/30/98	03/30/98	03/30/98	03/30/98	03/30/98
SAMPLE TIME	15:15	15:20	15:25	15:30	15:35
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01087	98R-01088	98R-01089	98R-01090	98R-01091
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-448	EVT-9803-449	EVT-9803-450	EVT-9803-451	EVT-9803-452

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	589.0	837.0	< 10.0	< 10.0	< 10.0
LEAD (PB) TOT	1123.0	1390.0	13.0	14.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA21	SA21	SA21	SA21	SA21	SA21
SAMPLE DATE	03/30/98	03/30/98	03/30/98	03/30/98	03/30/98	03/30/98
SAMPLE TIME	14:20	14:25	14:30	14:35	14:40	14:45
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01081	98R-01082	98R-01083	98R-01084	98R-01085	98R-01086
REMARKS						DUPLICATE
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	0-1'
SAMPLE NUMBER	EVT-9803-444A	EVT-9803-444B	EVT-9803-445	EVT-9803-446	EVT-9803-447A	EVT-9803-447B

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	275.0	331.0	290.0	104.0	< 10.0	252.0
LEAD (PB) TOT	323.0	387.0	344.0	140.0	< 10.0	304.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested  
Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;  
R: Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA22	SA22	SA22	SA22	SA22	SA22
SAMPLE DATE	04/08/98	04/08/98	04/08/98	04/08/98	04/08/98	04/08/98
SAMPLE TIME	09:07	9:07	9:10	9:15	9:20	9:25
LAB	TSC-SLC	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	258-3727	98R-01176	98R-01177	98R-01178	98R-01179	98R-01180
TYPE	HF					
DEPTH	0-1'	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9804-306	EVT-9804-306	EVT-9804-307	EVT-9804-308	EVT-9804-309	EVT-9804-310

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	42.0	37.0	20.0	20.0	30.0	< 10.0
LEAD (PB) TOT	<20.0	< 10.0	10.0	11.0	50.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SA22
SAMPLE DATE	04/08/98
SAMPLE TIME	9:30
LAB	RUSTON
LAB NUMBER	98R-01181
REMARKS	DUPLICATE
DEPTH	4-5'
SAMPLE NUMBER	EVT-9804-311

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	< 10.0
LEAD (PB) TOT	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA23	SA23	SA23	SA23	SA23	SA23
SAMPLE DATE	03/26/98	03/26/98	03/26/98	03/26/98	03/26/98	03/26/98
SAMPLE TIME	8:30	8:35	8:40	8:45	8:50	8:55
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01022	98R-01023	98R-01024	98R-01025	98R-01026	98R-01027
REMARKS						DUPLICATE
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	4-5'
SAMPLE NUMBER	EVT-9803-425	EVT-9803-426	EVT-9803-427	EVT-9803-428	EVT-9803-429	EVT-9803-430

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	25.0	12.0	< 10.0	12.0	< 10.0	< 10.0
LEAD (PB) TOT	211.0	28.0	19.0	82.0	36.0	35.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA24	SA24	SA24	SA24	SA24
SAMPLE DATE	03/18/98	04/01/98	04/01/98	04/01/98	04/01/98
SAMPLE TIME	12:30	14:45	14:50	14:55	15:00
LAB	TSC-SLC	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	258-3730	98R-01117	98R-01118	98R-01119	98R-01120
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9804-300	EVT-9804-301	EVT-9804-302	EVT-9804-303	EVT-9804-304

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	<18.0	< 10.0	36.0	< 10.0	< 10.0
LEAD (PB) TOT	<20.0	< 10.0	63.0	< 10.0	17.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA25	SA25	SA25	SA25	SA25	SA25
SAMPLE DATE	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98
SAMPLE TIME	16:40	16:45	16:55	17:00	17:05	17:10
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00874	98R-00875	98R-00876	98R-00877	98R-00878	98R-00879
REMARKS					DUPLICATE	
DEPTH	0-1'	1-2'	2-3'	3-4'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-315	EVT-9803-316	EVT-9803-317	EVT-9803-318	EVT-9803-319	EVT-9803-320

-- METALS & MINOR CONSTITUENTS --

ARSENIC (AS) TOT	249.0	429.0	122.0	< 10.0	< 10.0	140.0
LEAD (PB) TOT	36.0	43.0	10.0	< 10.0	< 10.0	12.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SA26	SA26	SA26	SA26	SA26	SA26
SAMPLE DATE	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98
SAMPLE TIME	8:55	9:00	9:05	9:10	09:50	9:15
LAB	RUSTON	RUSTON	RUSTON	RUSTON	TSC-SLC	RUSTON
LAB NUMBER	98R-00883	98R-00884	98R-00885	98R-00886	258-3723	98R-00887
TYPE					HF	
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	4-5'
SAMPLE NUMBER	EVT-9803-321	EVT-9803-322	EVT-9803-323	EVT-9803-324	EVT-9803-325A	EVT-9803-325A

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	228.0	1105.0	390.0	54.0	97.0	101.0
LEAD (PB) TOT	72.0	257.0	10.0	< 10.0	<20.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	SOUTHERN-CLEAF	SOUTHERN-CLEAF	SOUTHERN-CLEAF	SOUTHERN-CLEAF	SOUTHERN-CLEAF
SAMPLE DATE	04/03/98	04/03/98	04/03/98	04/03/98	04/03/98
SAMPLE TIME	13:30	13:35	13:40	13:45	13:50
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01131	98R-01132	98R-01133	98R-01134	98R-01135
DEPTH	SURFACE	SURFACE	SURFACE	SURFACE	SURFACE
SAMPLE NUMBER	EVT-9804-600	EVT-9804-601	EVT-9804-602	EVT-9804-603	EVT-9804-604

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	18.0	82.0	15.0	64.0	65.0
LEAD (PB) TOT	35.0	364.0	14.0	403.0	329.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TB1	TB1	TB1	TB1	TB1	TB1
SAMPLE DATE	04/01/98	04/01/98	04/01/98	04/01/98	04/01/98	04/01/98
SAMPLE TIME	8:45	8:50	8:55	9:00	9:05	9:10
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01122	98R-01123	98R-01124	98R-01125	98R-01126	98R-01127
DEPTH	2-3.5'	5-6.5'	10-11.5'	15-16.5'	20-21.5'	25-26.5'
SAMPLE NUMBER	EVT-9804-520	EVT-9804-521	EVT-9804-522	EVT-9804-523	EVT-9804-524	EVT-9804-525

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	46.0	48.0	695.0	455.0	197.0	201.0
LEAD (PB) TOT	27.0 J4	417.0	63.0 J4	13.0 J4	12.0 J4	< 10.0 UJ4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TB1	TB1	TB1	TB1
SAMPLE DATE	04/01/98	04/01/98	04/01/98	04/09/98
SAMPLE TIME	9:15	9:20	9:35	
LAB	RUSTON	RUSTON	RUSTON	TSC-SLC
LAB NUMBER	98R-01128	98R-01129	98R-01130	258-3731
REMARKS			DUPLICATE	
DEPTH	30-31.5'	35-36.5'	2-3.5'	0-0.5'
SAMPLE NUMBER	EVT-9804-526	EVT-9804-527	EVT-9804-530	EVT-9804-519

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	120.0	76.0	60.0	<18.0
LEAD (PB) TOT	< 10.0 UJ4	< 10.0 UJ4	54.0 J4	<20.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TB2	TB2	TB2	TB2	TB2	TB2
SAMPLE DATE	03/31/98	03/31/98	03/31/98	03/31/98	03/31/98	03/31/98
SAMPLE TIME	13:45	13:50	13:55	14:00	14:00	14:05
LAB	RUSTON	RUSTON	RUSTON	TSC-SLC	RUSTON	RUSTON
LAB NUMBER	98R-01108	98R-01109	98R-01110	258-3726	98R-01111	98R-01112
TYPE				HF		
DEPTH	0-0.5'	2-3.5'	5-6.5'	10-11.5'	10-11.5'	15-16.5'
SAMPLE NUMBER	EVT-9803-511	EVT-9803-512	EVT-9803-513	EVT-9803-514	EVT-9803-514	EVT-9803-515

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	< 10.0	115.0	28.0	47.0	47.0	502.0
LEAD (PB) TOT	< 10.0	297.0	222.0	51.0	52.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TB2	TB2	TB2
SAMPLE DATE	03/31/98	03/31/98	03/31/98
SAMPLE TIME	14:10	14:15	14:20
LAB	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01113	98R-01114	98R-01115
DEPTH	20-21.5'	30-31.5'	35-36.5'
SAMPLE NUMBER	EVT-9803-516	EVT-9803-517	EVT-9803-518

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	15.0	< 10.0	< 10.0
LEAD (PB) TOT	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TB3	TB3	TB3	TB3	TB3	TB3
SAMPLE DATE	03/31/98	03/31/98	03/31/98	03/31/98	03/31/98	03/31/98
SAMPLE TIME	8:05	8:10	8:15	8:20	8:25	8:30
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01098	98R-01099	98R-01100	98R-01101	98R-01102	98R-01103
DEPTH	2-3.5'	5-6.5'	10-11.5'	15-16.5'	20-21.5'	25-26.5'
SAMPLE NUMBER	EVT-9803-501	EVT-9803-502	EVT-9803-503	EVT-9803-504	EVT-9803-505	EVT-9803-506

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	218.0	20.0	660.0	194.0	206.0	< 10.0
LEAD (PB) TOT	158.0	31.0	40.0	< 10.0	< 10.0	13.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TB3	TB3	TB3	TB3	TB3
SAMPLE DATE	03/31/98	03/31/98	03/31/98	03/31/98	04/09/98
SAMPLE TIME	8:35	8:40	9:20	9:25	
LAB	RUSTON	RUSTON	RUSTON	RUSTON	TSC-SLC
LAB NUMBER	98R-01104	98R-01105	98R-01106	98R-01107	258-3729
REMARKS		DUPLICATE			
DEPTH	30-31.5'	15-16.5'	35-36.5'	37.5-39'	0-.5'
SAMPLE NUMBER	EVT-9803-507	EVT-9803-508	EVT-9803-509	EVT-9803-510	EVT-9803-500

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	< 10.0	190.0	< 10.0	291.0	<18.0
LEAD (PB) TOT	< 10.0	< 10.0	< 10.0	< 10.0	<20.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP3	TP3	TP3	TP3	TP3	TP3
SAMPLE DATE	03/20/98	03/20/98	03/20/98	03/20/98	03/20/98	03/20/98
SAMPLE TIME	11:00	11:02	11:04	11:06	8:51	11:10
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00846	98R-00847	98R-00848	98R-00849	98R-00850	98R-00851
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	5-6'
SAMPLE NUMBER	EVT-9803-169	EVT-9803-170	EVT-9803-171	EVT-9803-172	EVT-9803-173	EVT-9803-174

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1704.0	9043.0	21686.0	28579.0	1883.0	1259.0
LEAD (PB) TOT	911.0	2425.0	89.0	51.0	58.0	34.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP3-BH	TP3-BH	TP3-BH	TP3-BH	TP3-BH	TP3-BH
SAMPLE DATE	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98	03/23/98
SAMPLE TIME	13:15	13:20	13:25	13:30	13:35	13:40
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00945	98R-00946	98R-00947	98R-00948	98R-00949	98R-00950
DEPTH	5-6'	6-7'	7-8'	8-9'	9-10'	10-11'
SAMPLE NUMBER	EVT-9803-175	EVT-9803-176	EVT-9803-177	EVT-9803-178	EVT-9803-179	EVT-9803-180

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	6902.0	7084.0	203.0	507.0	655.0	744.0
LEAD (PB) TOT	792.0	275.0	13.0	< 10.0	< 10.0	12.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP1-BH
SAMPLE DATE	03/23/98
SAMPLE TIME	13:45
LAB	RUSTON
LAB NUMBER	98R-00951
REMARKS	DUPLICATE
DEPTH	10-11'
SAMPLE NUMBER	EVT-9803-181

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	822.0
LEAD (PB) TOT	< 10.0

NOTES: All results in mg/L (Water) or mg/Kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP4	TP4	TP4	TP4	TP4	TP4
SAMPLE DATE	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98
SAMPLE TIME	12:00	12:02	12:04	12:06	12:08	12:10
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00789	98R-00790	98R-00791	98R-00792	98R-00793	98R-00794
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	5-6'
SAMPLE NUMBER	EVT-9803-112	EVT-9803-113	EVT-9803-114	EVT-9803-115	EVT-9803-116	EVT-9803-117

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	565.0	1981.0	8799.0	32918.0	4724.0	1600.0
LEAD (PB) TOT	152.0	144.0	533.0	468.0	30.0	16.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP4
SAMPLE DATE	03/18/98
SAMPLE TIME	12:12
LAB	RUSTON
LAB NUMBER	98R-00795
REMARKS	DUPLICATE
DEPTH	3-4'
SAMPLE NUMBER	EVT-9803-118

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	31998.0
LEAD (PB) TOT	544.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP4-BH	TP4-BH	TP4-BH	TP4-BH
SAMPLE DATE	04/07/98	04/07/98	04/07/98	04/07/98
SAMPLE TIME	15:00	15:05	15:10	15:15
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01172	98R-01173	98R-01174	98R-01175
DEPTH	5-6'	6-7'	8-9'	10-11'
SAMPLE NUMBER	EVT-9804-120	EVT-9804-121	EVT-9804-122	EVT-9804-123

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	611.0	225.0	219.0	206.0
LEAD (PB) TOT	< 10.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP5	TP5	TP5	TP5	TP5	TP5
SAMPLE DATE	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98
SAMPLE TIME	8:40	8:42		8:44	8:46	8:48
LAB	RUSTON	RUSTON	TSC-SLC	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00803	98R-00804	L980744-1	98R-00805	98R-00806	98R-00807
TYPE			SPLP			
DEPTH	0-1'	1-2'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-126	EVT-9803-127	EVT-9803-127-SP	EVT-9803-128	EVT-9803-129	EVT-9803-130

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1161.0	5370.0	27.0	2777.0	827.0	502.0
BARIUM (BA) TOT			0.21			
CADMIUM (CD) TOT			<0.05			
CHROMIUM (CR) TOT			<0.1			
LEAD (PB) TOT	473.0	92.0	0.28	34.0	13.0	< 10.0
MERCURY (HG) TOT			0.0065			
SELENIUM (SE) TOT			<0.1			
SILVER (AG) TOT			<0.05			

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP5
SAMPLE DATE	03/19/98
SAMPLE TIME	8:50
LAB	RUSTON
LAB NUMBER	98R-00808
REMARKS	DUPLICATE
DEPTH	1-2'
SAMPLE NUMBER	EVT-9803-131

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	5082.0
LEAD (PB) TOT	83.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP6A	TP6A	TP6A	TP6A	TP6A	TP6A
SAMPLE DATE	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98
SAMPLE TIME	10:20	10:25		10:30	10:35	10:40
LAB	RUSTON	RUSTON	TSC-SLC	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00783	98R-00784	L980744-2	98R-00785	98R-00786	98R-00787
TYPE			SPLP			
DEPTH	0-1'	1-2'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-106	EVT-9803-107	EVT-9803-107-SP	EVT-9803-108	EVT-9803-109	EVT-9803-110

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	4373.0	12487.0	7.0	9726.0	9252.0	4305.0
BARIUM (BA) TOT			044			
CADMIUM (CD) TOT			<0.05			
CHROMIUM (CR) TOT			<0.1			
LEAD (PB) TOT	289.0	458.0	0.3	38.0	29.0	< 10.0
MERCURY (HG) TOT			0.052			
SELENIUM (SE) TOT			<0.1			
SILVER (AG) TOT			<0.05			

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP6A
SAMPLE DATE	03/18/98
SAMPLE TIME	10:45
LAB	RUSTON
LAB NUMBER	98R-00788
DEPTH	5-6'
SAMPLE NUMBER	EVT-9803-111

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	3235.0
LEAD (PB) TOT	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP6A-BH	TP6A-BH	TP6A-BH	TP6A-BH	TP6A-BH
SAMPLE DATE	04/07/98	04/07/98	04/07/98	04/07/98	04/07/98
SAMPLE TIME	11:40	11:45	11:50	11:55	12:35
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01167	98R-01168	98R-01169	98R-01170	98R-01171
DEPTH	5-6'	6-7'	8-9'	10-11'	12-13'
SAMPLE NUMBER	EVT-9804-115	EVT-9804-116	EVT-9804-117	EVT-9804-118	EVT-9804-119

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	2335.0	353.0	706.0	412.0	249.0
LEAD (PB) TOT	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested  
Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;  
R: Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP6B	TP6B	TP6B	TP6B	TP6B	TP6B
SAMPLE DATE	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98
SAMPLE TIME	09:00	9:00	9:05	9:10	9:15	9:20
LAB	TSC-SLC	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	258-3721	98R-00777	98R-00778	98R-00779	98R-00780	98R-00781
TYPE	HF					
DEPTH	0-1'	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-100	EVT-9803-100	EVT-9803-101	EVT-9803-102	EVT-9803-103	EVT-9803-104

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	9576.0	9388.0	14223.0	13985.0	13537.0	5497.0
LEAD (PB) TOT	582.0	544.0	505.0	< 10.0	14.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

ASEV12 - ASARCO, Everett Smelter

## ANALYSES SUMMARY REPORT

DataMan Program

-- SAMPLE TYPE: SOIL --

SITE CODE	TP6B
SAMPLE DATE	03/18/98
SAMPLE TIME	9:25
LAB	RUSTON
LAB NUMBER	98R-00782
DEPTH	5-6'
SAMPLE NUMBER	EVT-9803-105

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	2740.0
LEAD (PB) TOT	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP7	TP7	TP7	TP7	TP7	TP7
SAMPLE DATE	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98
SAMPLE TIME	10:22	10:24	10:26	10:28		10:30
LAB	RUSTON	RUSTON	RUSTON	RUSTON	TSC-SLC	RUSTON
LAB NUMBER	98R-00809	98R-00810	98R-00811	98R-00812	L980744-4	98R-00813
TYPE					SPLP	
DEPTH	0-1'	1-2'	2-3'	3-4'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-132	EVT-9803-133	EVT-9803-134	EVT-9803-135	EVT-9803-135-SP	EVT-9803-136

-- METALS & MINOR CONSTITUENTS --

ARSENIC (AS) TOT	2220.0	8771.0	9935.0	10644.0	9.1	6586.0
BARIUM (BA) TOT					0.28	
CADMIUM (CD) TOT					<0.05	
CHROMIUM (CR) TOT					<0.1	
LEAD (PB) TOT	523.0	594.0	415.0	47.0	0.12	< 10.0
MERCURY (HG) TOT					0.0014	
SELENIUM (SE) TOT					<0.1	
SILVER (AG) TOT					<0.05	

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP7
SAMPLE DATE	03/19/98
SAMPLE TIME	10:32
LAB	RUSTON
LAB NUMBER	98R-00814
DEPTH	5-6'
SAMPLE NUMBER	EVT-9803-137

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	2952.0
LEAD (PB) TOT	12.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP7-BH	TP7-BH	TP7-BH	TP7-BH
SAMPLE DATE	04/06/98	04/06/98	04/06/98	04/06/98
SAMPLE TIME	16:55	17:00	17:05	17:10
LAB	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01157	98R-01158	98R-01159	98R-01160
DEPTH	5-6'	6-7'	8-9'	10-11'
SAMPLE NUMBER	EVT-9804-105	EVT-9804-106	EVT-9804-107	EVT-9804-108

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	815.0	684.0	698.0	541.0
LEAD (PB) TOT	< 10.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP8	TP8	TP8	TP8	TP8	TP8
SAMPLE DATE	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98
SAMPLE TIME	13:40	13:42	13:44	13:46	13:48	
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	TSC-SLC
LAB NUMBER	98R-00815	98R-00816	98R-00817	98R-00818	98R-00819	L980744-3
TYPE						SPLP
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	4-5'
SAMPLE NUMBER	EVT-9803-138	EVT-9803-139	EVT-9803-140	EVT-9803-141	EVT-9803-142	EVT-9803-142-SP

-- METALS & MINOR CONSTITUENTS --

	3738.0	2797.0	4619.0	7237.0	4669.0	8.6
ARSENIC (AS) TOT						0.54
BARIUM (BA) TOT						<0.05
CADMIUM (CD) TOT						<0.1
CHROMIUM (CR) TOT						<0.1
LEAD (PB) TOT	625.0	415.0	309.0	200.0	17.0	<0.1
MERCURY (HG) TOT						0.0066
SELENIUM (SE) TOT						<0.1
SILVER (AG) TOT						<0.05

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP8	TP8
SAMPLE DATE	03/19/98	03/19/98
SAMPLE TIME	13:50	13:52
LAB	RUSTON	RUSTON
LAB NUMBER	98R-00820	98R-00821
REMARKS		DUPLICATE
DEPTH	5-6'	1-2'
SAMPLE NUMBER	EVT-9803-143	EVT-9803-144

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	564.0	2869.0
LEAD (PB) TOT	11.0	492.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP9	TP9	TP9	TP9	TP9	TP9
SAMPLE DATE	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98	03/18/98
SAMPLE TIME	15:40	15:42	15:44	15:46	15:48	15:50
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00796	98R-00797	98R-00798	98R-00799	98R-00800	98R-00801
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	5-6'
SAMPLE NUMBER	EVT-9803-119	EVT-9803-120	EVT-9803-121	EVT-9803-122	EVT-9803-123	EVT-9803-124

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	31665.0	10503.0	5668.0	7821.0	1564.0	535.0
LEAD (PB) TOT	947.0	795.0	672.0	16.0	14.0	14.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP9
SAMPLE DATE	03/18/98
SAMPLE TIME	15:52
LAB	RUSTON
LAB NUMBER	98R-00802
REMARKS	DUPLICATE
DEPTH	1-2'
SAMPLE NUMBER	EVT-9803-125

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	12471.0
LEAD (PB) TOT	701.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested  
Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;  
R: Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP10A	TP10A	TP10A	TP10A	TP10A	TP10A
SAMPLE DATE	03/20/98	03/20/98	03/20/98	03/20/98	03/20/98	03/20/98
SAMPLE TIME	9:10	9:12	9:14	9:16	9:18	9:20
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00840	98R-00841	98R-00842	98R-00843	98R-00844	98R-00845
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	5-6'
SAMPLE NUMBER	EVT-9803-163	EVT-9803-164	EVT-9803-165	EVT-9803-166	EVT-9803-167	EVT-9803-168

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	473.0	2460.0	3571.0	2399.0	12491.0	2209.0
LEAD (PB) TOT	112.0	331.0	445.0	224.0	1309.0	20.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP10B	TP10B	TP10B	TP10B	TP10B	TP10B
SAMPLE DATE	03/20/98	03/20/98	03/20/98	03/20/98	03/20/98	03/20/98
SAMPLE TIME	8:40	8:42	8:44	8:46	8:48	8:50
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00833	98R-00834	98R-00835	98R-00836	98R-00837	98R-00838
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	5-6'
SAMPLE NUMBER	EVT-9803-156	EVT-9803-157	EVT-9803-158	EVT-9803-159	EVT-9803-160	EVT-9803-161

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	866.0	1356.0	3151.0	3277.0	15433.0	6748.0
LEAD (PB) TOT	420.0 J4	268.0 J4	284.0 J4	298.0 J4	599.0 J4	24.0 J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP10B
SAMPLE DATE	03/20/98
SAMPLE TIME	8:52
LAB	RUSTON
LAB NUMBER	98R-00839
REMARKS	DUPLICATE
DEPTH	0-1'
SAMPLE NUMBER	EVT-9803-162

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	869.0
LEAD (PB) TOT	258.0 J4

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP10B-BH	TP10B-BH	TP10B-BH	TP10B-BH	TP10B-BH
SAMPLE DATE	04/06/98	04/06/98	04/06/98	04/06/98	04/06/98
SAMPLE TIME	14:20	14:25	14:30	14:35	14:40
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01152	98R-01153	98R-01154	98R-01155	98R-01156
REMARKS					DUPLICATE
DEPTH	5-6'	6-7'	8-9'	10-11'	10-11'
SAMPLE NUMBER	EVT-9804-100	EVT-9804-101	EVT-9804-102	EVT-9804-103	EVT-9804-104

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1455.0	453.0	401.0	490.0	514.0
LEAD (PB) TOT	14.0	< 10.0	< 10.0	< 10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP11A	TP11A	TP11A	TP11A	TP11A
SAMPLE DATE	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98
SAMPLE TIME	16:15	16:17	16:19	16:21	16:23
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-00828	98R-00829	98R-00830	98R-00831	98R-00832
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'
SAMPLE NUMBER	EVT-9803-151	EVT-9803-152	EVT-9803-153	EVT-9803-154	EVT-9803-155

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	3148.0	4692.0	12893.0	53824.0	23094.0
LEAD (PB) TOT	101.0	209.0	558.0	186.0	22.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT: Total; DIS: Dissolved; TRC: Total Recoverable; E: Estimated; <: Less Than Detect. Blank: parameter not tested  
Validation Flags: A: Anomalous; UJ1: Blank; J2, UJ2: Standard; J3: Hold Time; J4, UJ4: Duplicate, Spike, or Split Exceedance;  
R: Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP11B	TP11B	TP11B	TP11B	TP11B	TP11B
SAMPLE DATE	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98	03/19/98
SAMPLE TIME	15:30	15:32	15:34	15:36	15:38	15:00
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	TSC-SLC
LAB NUMBER	98R-00822	98R-00823	98R-00824	98R-00825	98R-00826	258-3722
TYPE						HP
DEPTH	0-1'	1-2'	2-3'	3-4'	4-5'	5-6'
SAMPLE NUMBER	EVT-9803-145	EVT-9803-146	EVT-9803-147	EVT-9803-148	EVT-9803-149	EVT-9803-150

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	1722.0	6869.0	19691.0	19937.0	36165.0	12033.0
LEAD (PB) TOT	87.0	267.0	742.0	86.0	30.0	<20.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	TP11B
SAMPLE DATE	03/19/98
SAMPLE TIME	15:40
LAB	RUSTON
LAB NUMBER	98R-00827
DEPTH	5-6'
SAMPLE NUMBER	EVT-9803-150

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	11897.0
LEAD (PB) TOT	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

## -- SAMPLE TYPE: SOIL --

SITE CODE	TP11B-BH	TP11B-BH	TP11B-BH	TP11B-BH	TP11B-BH	TP11B-BH
SAMPLE DATE	04/07/98	04/07/98	04/07/98	04/07/98	04/07/98	04/07/98
SAMPLE TIME	8:20	8:25	8:30	8:35	8:40	8:45
LAB	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON	RUSTON
LAB NUMBER	98R-01161	98R-01162	98R-01163	98R-01164	98R-01165	98R-01166
REMARKS						DUPLICATE
DEPTH	5-6'	6-7'	8-9'	10-11'	12-13.5'	8-9'
SAMPLE NUMBER	EVT-9804-109	EVT-9804-110	EVT-9804-111	EVT-9804-112	EVT-9804-113	EVT-9804-114

## -- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	10359.0	8408.0	1450.0	504.0	212.0	1511.0
LEAD (PB) TOT	13.0	11.0	< 10.0	< 10.0	10.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
 TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
 Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
 R:Rejected.

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45	EVT-9803-428	98R-01025	03/26/98	SA23	45	98R-01022	EVT-9803-425	03/26/98	SA23
45	EVT-9803-429	98R-01026	03/26/98	SA23	45	98R-01023	EVT-9803-426	03/26/98	SA23
45	EVT-9803-430	98R-01027	03/26/98	SA23	45	98R-01024	EVT-9803-427	03/26/98	SA23
20	EVT-9803-431	98R-01028	03/26/98	SA3	45	98R-01025	EVT-9803-428	03/26/98	SA23
20	EVT-9803-432	98R-01029	03/26/98	SA3	45	98R-01026	EVT-9803-429	03/26/98	SA23
20	EVT-9803-433	98R-01030	03/26/98	SA3	45	98R-01027	EVT-9803-430	03/26/98	SA23
20	EVT-9803-434	98R-01031	03/26/98	SA3	20	98R-01028	EVT-9803-431	03/26/98	SA3
42	EVT-9803-444A	98R-01081	03/30/98	SA21	20	98R-01029	EVT-9803-432	03/26/98	SA3
42	EVT-9803-444B	98R-01082	03/30/98	SA21	20	98R-01030	EVT-9803-433	03/26/98	SA3
42	EVT-9803-445	98R-01083	03/30/98	SA21	20	98R-01031	EVT-9803-434	03/26/98	SA3
42	EVT-9803-446	98R-01084	03/30/98	SA21	42	98R-01081	EVT-9803-444A	03/30/98	SA21
42	EVT-9803-447A	98R-01085	03/30/98	SA21	42	98R-01082	EVT-9803-444B	03/30/98	SA21
42	EVT-9803-447B	98R-01086	03/30/98	SA21	42	98R-01083	EVT-9803-445	03/30/98	SA21
41	EVT-9803-448	98R-01087	03/30/98	SA20	42	98R-01084	EVT-9803-446	03/30/98	SA21
41	EVT-9803-449	98R-01088	03/30/98	SA20	42	98R-01085	EVT-9803-447A	03/30/98	SA21
41	EVT-9803-450	98R-01089	03/30/98	SA20	42	98R-01086	EVT-9803-447B	03/30/98	SA21
41	EVT-9803-451	98R-01090	03/30/98	SA20	41	98R-01087	EVT-9803-448	03/30/98	SA20
41	EVT-9803-452	98R-01091	03/30/98	SA20	41	98R-01088	EVT-9803-449	03/30/98	SA20
40	EVT-9803-453	98R-01092	03/30/98	SA19	41	98R-01089	EVT-9803-450	03/30/98	SA20
40	EVT-9803-454	98R-01093	03/30/98	SA19	41	98R-01090	EVT-9803-451	03/30/98	SA20
40	EVT-9803-455	98R-01094	03/30/98	SA19	41	98R-01091	EVT-9803-452	03/30/98	SA20
40	EVT-9803-457	98R-01095	03/30/98	SA19	40	98R-01092	EVT-9803-453	03/30/98	SA19
40	EVT-9803-458	98R-01096	03/30/98	SA19	40	98R-01093	EVT-9803-454	03/30/98	SA19
55	EVT-9803-500	258-3729	04/09/98	TB3	40	98R-01094	EVT-9803-455	03/30/98	SA19
54	EVT-9803-501	98R-01098	03/31/98	TB3	40	98R-01095	EVT-9803-457	03/30/98	SA19
54	EVT-9803-502	98R-01099	03/31/98	TB3	40	98R-01096	EVT-9803-458	03/30/98	SA19
54	EVT-9803-503	98R-01100	03/31/98	TB3	54	98R-01098	EVT-9803-501	03/31/98	TB3
54	EVT-9803-504	98R-01101	03/31/98	TB3	54	98R-01099	EVT-9803-502	03/31/98	TB3
54	EVT-9803-505	98R-01102	03/31/98	TB3	54	98R-01100	EVT-9803-503	03/31/98	TB3
54	EVT-9803-506	98R-01103	03/31/98	TB3	54	98R-01101	EVT-9803-504	03/31/98	TB3
55	EVT-9803-507	98R-01104	03/31/98	TB3	54	98R-01102	EVT-9803-505	03/31/98	TB3
55	EVT-9803-508	98R-01105	03/31/98	TB3	54	98R-01103	EVT-9803-506	03/31/98	TB3
55	EVT-9803-509	98R-01106	03/31/98	TB3	55	98R-01104	EVT-9803-507	03/31/98	TB3
55	EVT-9803-510	98R-01107	03/31/98	TB3	55	98R-01105	EVT-9803-508	03/31/98	TB3
52	EVT-9803-511	98R-01108	03/31/98	TB2	55	98R-01106	EVT-9803-509	03/31/98	TB3
52	EVT-9803-512	98R-01109	03/31/98	TB2	55	98R-01107	EVT-9803-510	03/31/98	TB3
52	EVT-9803-513	98R-01110	03/31/98	TB2	52	98R-01108	EVT-9803-511	03/31/98	TB2
52	EVT-9803-514	258-3726	03/31/98	TB2	52	98R-01109	EVT-9803-512	03/31/98	TB2
52	EVT-9803-514	98R-01111	03/31/98	TB2	52	98R-01110	EVT-9803-513	03/31/98	TB2
52	EVT-9803-515	98R-01112	03/31/98	TB2	52	98R-01111	EVT-9803-514	03/31/98	TB2
53	EVT-9803-516	98R-01113	03/31/98	TB2	52	98R-01112	EVT-9803-515	03/31/98	TB2
53	EVT-9803-517	98R-01114	03/31/98	TB2	53	98R-01113	EVT-9803-516	03/31/98	TB2
53	EVT-9803-518	98R-01115	03/31/98	TB2	53	98R-01114	EVT-9803-517	03/31/98	TB2
79	EVT-9804-100	98R-01152	04/06/98	TP10B-BH	53	98R-01115	EVT-9803-518	03/31/98	TB2
79	EVT-9804-101	98R-01153	04/06/98	TP10B-BH	46	98R-01117	EVT-9804-301	04/01/98	SA24
79	EVT-9804-102	98R-01154	04/06/98	TP10B-BH	46	98R-01118	EVT-9804-302	04/01/98	SA24
79	EVT-9804-103	98R-01155	04/06/98	TP10B-BH	46	98R-01119	EVT-9804-303	04/01/98	SA24
79	EVT-9804-104	98R-01156	04/06/98	TP10B-BH	46	98R-01120	EVT-9804-304	04/01/98	SA24
71	EVT-9804-105	98R-01157	04/06/98	TP7-BH	50	98R-01122	EVT-9804-520	04/01/98	TB1
71	EVT-9804-106	98R-01158	04/06/98	TP7-BH	50	98R-01123	EVT-9804-521	04/01/98	TB1
71	EVT-9804-107	98R-01159	04/06/98	TP7-BH	50	98R-01124	EVT-9804-522	04/01/98	TB1
71	EVT-9804-108	98R-01160	04/06/98	TP7-BH	50	98R-01125	EVT-9804-523	04/01/98	TB1
83	EVT-9804-109	98R-01161	04/07/98	TP11B-BH	50	98R-01126	EVT-9804-524	04/01/98	TB1
83	EVT-9804-110	98R-01162	04/07/98	TP11B-BH	50	98R-01127	EVT-9804-525	04/01/98	TB1
83	EVT-9804-111	98R-01163	04/07/98	TP11B-BH	51	98R-01128	EVT-9804-526	04/01/98	TB1
83	EVT-9804-112	98R-01164	04/07/98	TP11B-BH	51	98R-01129	EVT-9804-527	04/01/98	TB1
83	EVT-9804-113	98R-01165	04/07/98	TP11B-BH	51	98R-01130	EVT-9804-530	04/01/98	TB1
83	EVT-9804-114	98R-01166	04/07/98	TP11B-BH	49	98R-01131	EVT-9804-600	04/03/98	SOUTHERN-CLEAF
66	EVT-9804-115	98R-01167	04/07/98	TP6A-BH	49	98R-01132	EVT-9804-601	04/03/98	SOUTHERN-CLEAF
66	EVT-9804-116	98R-01168	04/07/98	TP6A-BH	49	98R-01133	EVT-9804-602	04/03/98	SOUTHERN-CLEAF
66	EVT-9804-117	98R-01169	04/07/98	TP6A-BH	49	98R-01134	EVT-9804-603	04/03/98	SOUTHERN-CLEAF
66	EVT-9804-118	98R-01170	04/07/98	TP6A-BH	49	98R-01135	EVT-9804-604	04/03/98	SOUTHERN-CLEAF
66	EVT-9804-119	98R-01171	04/07/98	TP6A-BH	79	98R-01152	EVT-9804-100	04/06/98	TP10B-BH
61	EVT-9804-120	98R-01172	04/07/98	TP4-BH	79	98R-01153	EVT-9804-101	04/06/98	TP10B-BH
61	EVT-9804-121	98R-01173	04/07/98	TP4-BH	79	98R-01154	EVT-9804-102	04/06/98	TP10B-BH
61	EVT-9804-122	98R-01174	04/07/98	TP4-BH	79	98R-01155	EVT-9804-103	04/06/98	TP10B-BH
61	EVT-9804-123	98R-01175	04/07/98	TP4-BH	79	98R-01156	EVT-9804-104	04/06/98	TP10B-BH
46	EVT-9804-300	258-3730	03/18/98	SA24	71	98R-01157	EVT-9804-105	04/06/98	TP7-BH
46	EVT-9804-301	98R-01117	04/01/98	SA24	71	98R-01158	EVT-9804-106	04/06/98	TP7-BH
46	EVT-9804-302	98R-01118	04/01/98	SA24	71	98R-01159	EVT-9804-107	04/06/98	TP7-BH

**APPENDIX D-3**  
**Confirmation Sample Database**

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ANALYSES SUMMARY REPORT

-- SAMPLE TYPE: SOIL --

SITE CODE	HA11	HA11	SAS	SAS
SAMPLE DATE	04/09/98	04/09/98	03/23/98	03/23/98
SAMPLE TIME	10:50	10:05	10:50	10:15
LAB	TSC-SLC	RUSTON	TSC-SLC	RUSTON
LAB NUMBER	258-3728	98R-01225	258-3724	98R-00965
TYPE	HF		HF	
DEPTH	4-4.5'	4-4.5'	0-1'	0-1'
SAMPLE NUMBER	EVT-9804-356	EVT-9804-356	EVT-9803-376	EVT-9803-376

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	31.0	20.0	4750.0	4677.0
LEAD (PB) TOT	210.0	183.0	947.0	942.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

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ANALYSES SUMMARY REPORT

DataMan Program

-- SAMPLE TYPE: SOIL --

SITE CODE	SA18	SA18	SA22	SA22
SAMPLE DATE	03/25/98	03/25/98	04/08/98	04/08/98
SAMPLE TIME	15:00	15:50	09:07	9:07
LAB	TSC-SLC	RUSTON	TSC-SLC	RUSTON
LAB NUMBER	258-3725	98R-01013	258-3727	98R-01176
TYPE	HP		HP	
DEPTH	4-5'	4-5'	0-1'	0-1'
SAMPLE NUMBER	EVT-9803-424	EVT-9803-424	EVT-9804-306	EVT-9804-306

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	<18.0	13.0	42.0	37.0
LEAD (PB) TOT	<20.0	< 10.0	<20.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

-- SAMPLE TYPE: SOIL --

SITE CODE	SA26	SA26	TB2	TB2
SAMPLE DATE	03/19/98	03/19/98	03/31/98	03/31/98
SAMPLE TIME	09:50	9:15	14:00	14:00
LAB	TSC-SLC	RUSTON	TSC-SLC	RUSTON
LAB NUMBER	258-1723	98R-00887	258-1726	98R-01111
TYPE	HF		HF	
DEPTH	4-5'	4-5'	10-11.5'	10-11.5'
SAMPLE NUMBER	EVT-9803-325A	EVT-9803-325A	EVT-9803-514	EVT-9803-514

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	97.0	101.0	47.0	47.0
LEAD (PB) TOT	<20.0	< 10.0	51.0	52.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

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ANALYSES SUMMARY REPORT

DataMan Program

-- SAMPLE TYPE: SOIL --

SITE CODE	TP6B	TP6B	TP11B	TP11B
SAMPLE DATE	03/18/98	03/18/98	03/19/98	03/19/98
SAMPLE TIME	09:00	9:00	15:00	15:40
LAB	TSC-SLC	RUSTON	TSC-SLC	RUSTON
LAB NUMBER	258-3721	98R-00777	258-3722	98R-00827
TYPE	HP		HP	
DEPTH	0-1'	0-1'	5-6'	5-6'
SAMPLE NUMBER	EVT-9803-100	EVT-9803-100	EVT-9803-150	EVT-9803-150

-- METALS &amp; MINOR CONSTITUENTS --

ARSENIC (AS) TOT	9576.0	9388.0	12033.0	11897.0
LEAD (PB) TOT	582.0	544.0	<20.0	< 10.0

NOTES: All results in mg/L (Water) or mg/kg (Soil) unless noted and are laboratory (LAB) unless field (FLD) or calculated (CALC)  
TOT:Total; DIS:Dissolved; TRC:Total Recoverable; E:Estimated; <:Less Than Detect. Blank: parameter not tested  
Validation Flags: A:Anomalous; UJ1:Blank; J2,UJ2: Standard; J3:Hold Time; J4,UJ4:Duplicate, Spike, or Split Exceedance;  
R:Rejected.

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ANALYSES SUMMARY REPORT

## INDEX

Page	Site Code	Site Name	Site Type	Elevation MP	Well Depth
1	HA11	HA11	Soil		
1	SA5	SA5	Soil		
2	SA18	SA18	Soil		
2	SA22	SA22	Soil		
3	SA26	SA26	Soil		
3	TB2	TB2	Soil		
4	TP6B	TP6B	Soil		
4	TP11B	TP11B	Soil		

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ANALYSES SUMMARY REPORT

## INDEX

SAMPLE NUMBER ORDER				
Page	Sample Number	Lab ##	Date	Site Code
4	EVT-9803-100	258-3721	03/18/98	TP6B
4	EVT-9803-100	98R-00777	03/18/98	TP6B
4	EVT-9803-150	258-3722	03/19/98	TP11B
4	EVT-9803-150	98R-00827	03/19/98	TP11B
3	EVT-9803-325A	258-3723	03/19/98	SA26
3	EVT-9803-325A	98R-00887	03/19/98	SA26
1	EVT-9803-376	258-3724	03/23/98	SA5
1	EVT-9803-376	98R-00965	03/23/98	SA5
2	EVT-9803-424	258-3725	03/25/98	SA18
2	EVT-9803-424	98R-01013	03/25/98	SA18
3	EVT-9803-514	258-3726	03/31/98	TB2
3	EVT-9803-514	98R-01111	03/31/98	TB2
2	EVT-9804-306	258-3727	04/08/98	SA22
2	EVT-9804-306	98R-01176	04/08/98	SA22
1	EVT-9804-356	258-3728	04/09/98	HA11
1	EVT-9804-356	98R-01225	04/09/98	HA11

LAB NUMBER ORDER				
Page	Lab ##	Sample Number	Date	Site Code
4	258-3721	EVT-9803-100	03/18/98	TP6B
4	258-3722	EVT-9803-150	03/19/98	TP11B
3	258-3723	EVT-9803-325A	03/19/98	SA26
1	258-3724	EVT-9803-376	03/23/98	SA5
2	258-3725	EVT-9803-424	03/25/98	SA18
3	258-3726	EVT-9803-514	03/31/98	TB2
2	258-3727	EVT-9804-306	04/08/98	SA22
1	258-3728	EVT-9804-356	04/09/98	HA11
4	98R-00777	EVT-9803-100	03/18/98	TP6B
4	98R-00827	EVT-9803-150	03/19/98	TP11B
3	98R-00887	EVT-9803-325A	03/19/98	SA26
1	98R-00965	EVT-9803-376	03/23/98	SA5
2	98R-01013	EVT-9803-424	03/25/98	SA18
3	98R-01111	EVT-9803-514	03/31/98	TB2
2	98R-01176	EVT-9804-306	04/08/98	SA22
1	98R-01225	EVT-9804-356	04/09/98	HA11

**APPENDIX D-4**  
**Regression Statistics**

**Arsenic**

# ARSENIC (AS) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	RUSTON	% Recovery	Difference	Abs of Diff
EVT-9803-100	3/18/98	9576	9388	98.0%	188	188
EVT-9803-150	3/19/98	12033	11897	98.9%	136	136
EVT-9803-325A	3/19/98	97	101	104.1%	-4	4
EVT-9803-376	3/23/98	4750	4677	98.5%	73	73
EVT-9803-424	3/25/98	<18.0	13	UDL	5	5
EVT-9803-514	3/31/98	47	47	100.0%	0	0
EVT-9804-306	4/8/98	42	37	88.1%	5	5
EVT-9804-356	4/9/98	31	20	64.5%	11	11

# ARSENIC (AS) COMPARISON STATISTICAL SUMMARY

Regression Statistics	
Multiple R	0.999988038
R Square	0.999976076
Adjusted R Square	0.999972088
Standard Error	25.71890484
Observations	8

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	165883811.2	165883811.2	250783.5592	4.27936E-15
Residual	6	3968.772397	661.4620662		
Total	7	165887780			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-4.855401912	11.20324742	-0.433392367	0.679877379	-32.26878083	22.55797701
TSC-SLC HF	0.985893179	0.001968704	500.7829462	4.27936E-15	0.981075932	0.990710427

## t-Test: Paired Two Sample for Means

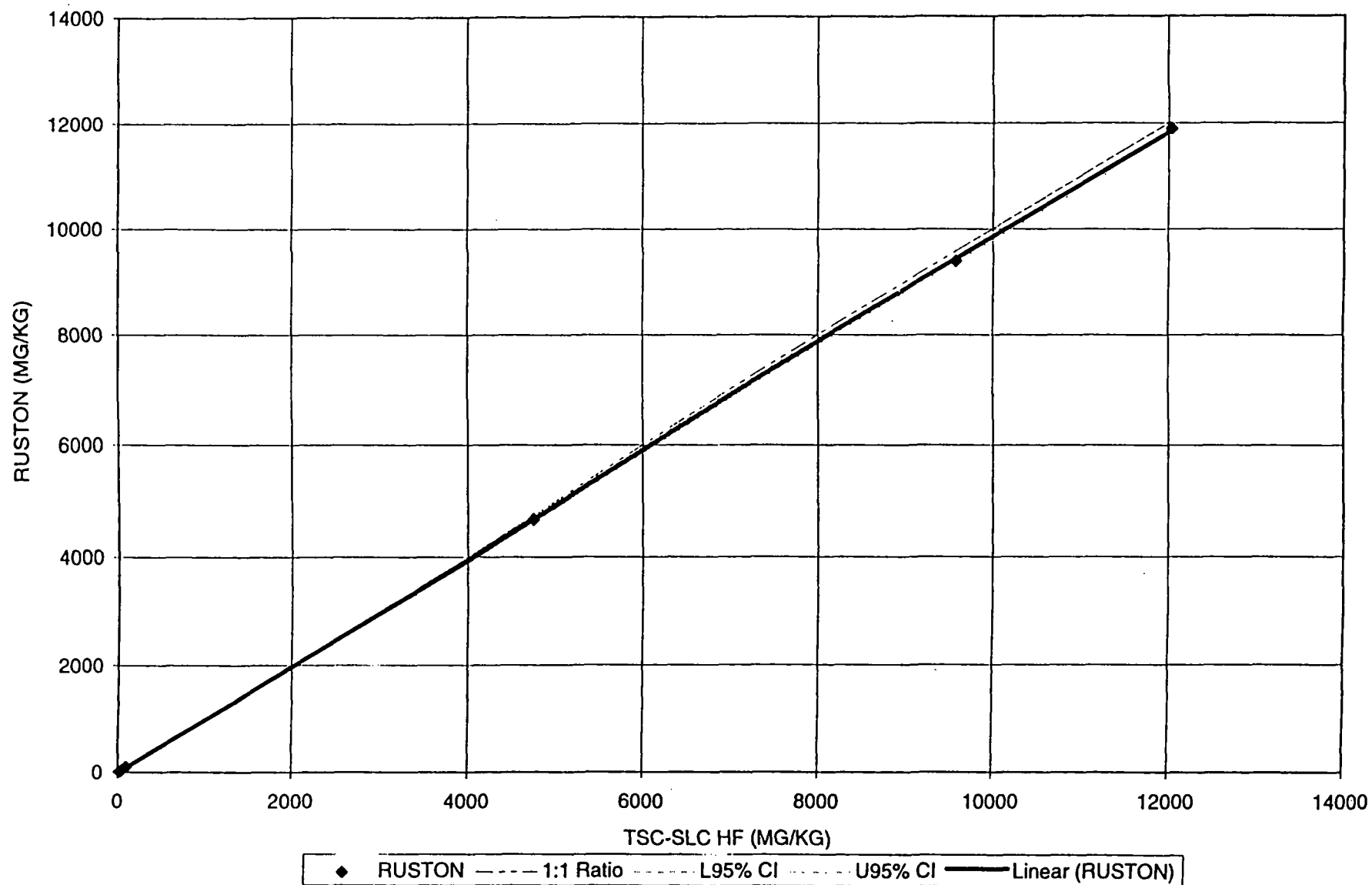
	TSC-SLC HF	RUSTON
Mean	3324.25	3272.5
Variance	24380703.93	23698254.29
Observations	8	8
Pearson Correlation	0.999988038	
Hypothesized Mean Difference	0	
df	7	
t Stat	1.988402768	
P(T<=t) one-tail	0.043548066	
t Critical one-tail	1.894577508	
P(T<=t) two-tail	0.087096132	
t Critical two-tail	2.36462256	

Descriptive Statistics	TSC-SLC HF	RUSTON
Mean	3324.25	3272.5
Standard Error	1745.734227	1721.128056
Median	72	74
Mode	#N/A	#N/A
Standard Deviation	4937.68204	4868.085279
Sample Variance	24380703.93	23698254.29
Kurtosis	-0.36594429	-0.334081614
Skewness	1.157731728	1.163391559
Range	12015	11884
Minimum	18	13
Maximum	12033	11897
Sum	26594	26180
Count	8	8
Confidence Level(95.000%)	3421.571145	3373.344008

# ARSENIC (AS) REGRESSION CHART

$$y = 0.9859x - 4.8554$$

$$R^2 = 1$$



**Lead**

# LEAD (PB) REGRESSION ANALYSIS DATA

Sample No	Samp Date	TSC-SLC HF	RUSTON	% Recovery	Difference	Abs of Diff
EVT-9803-100	3/18/98	582	544	93.5%	38	38
EVT-9803-150	3/19/98	<20.0	< 10	UDL	10	10
EVT-9803-325A	3/19/98	<20.0	< 10	UDL	10	10
EVT-9803-376	3/23/98	947	942	99.5%	5	5
EVT-9803-424	3/25/98	<20.0	< 10	UDL	10	10
EVT-9803-514	3/31/98	51	52	102.0%	-1	1
EVT-9804-306	4/8/98	<20.0	< 10	UDL	10	10
EVT-9804-356	4/9/98	210	183	87.1%	27	27

# LEAD (PB) COMPARISON STATISTICAL SUMMARY

## Regression Statistics

Multiple R	0.999373683
R Square	0.998747757
Adjusted R Square	0.99853905
Standard Error	13.17941896
Observations	8

## ANOVA

	df	SS	MS	F	Significance F
Regression	1	831210.6925	831210.6925	4785.403832	6.13931E-10
Residual	6	1042.182505	173.6970842		
Total	7	832252.875			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-11.47411014	5.737667979	-1.999786356	0.092453677	-25.51368818	2.565467901
TSC-SLC HF	0.990798332	0.014322735	69.17661333	6.13931E-10	0.955751835	1.025844829

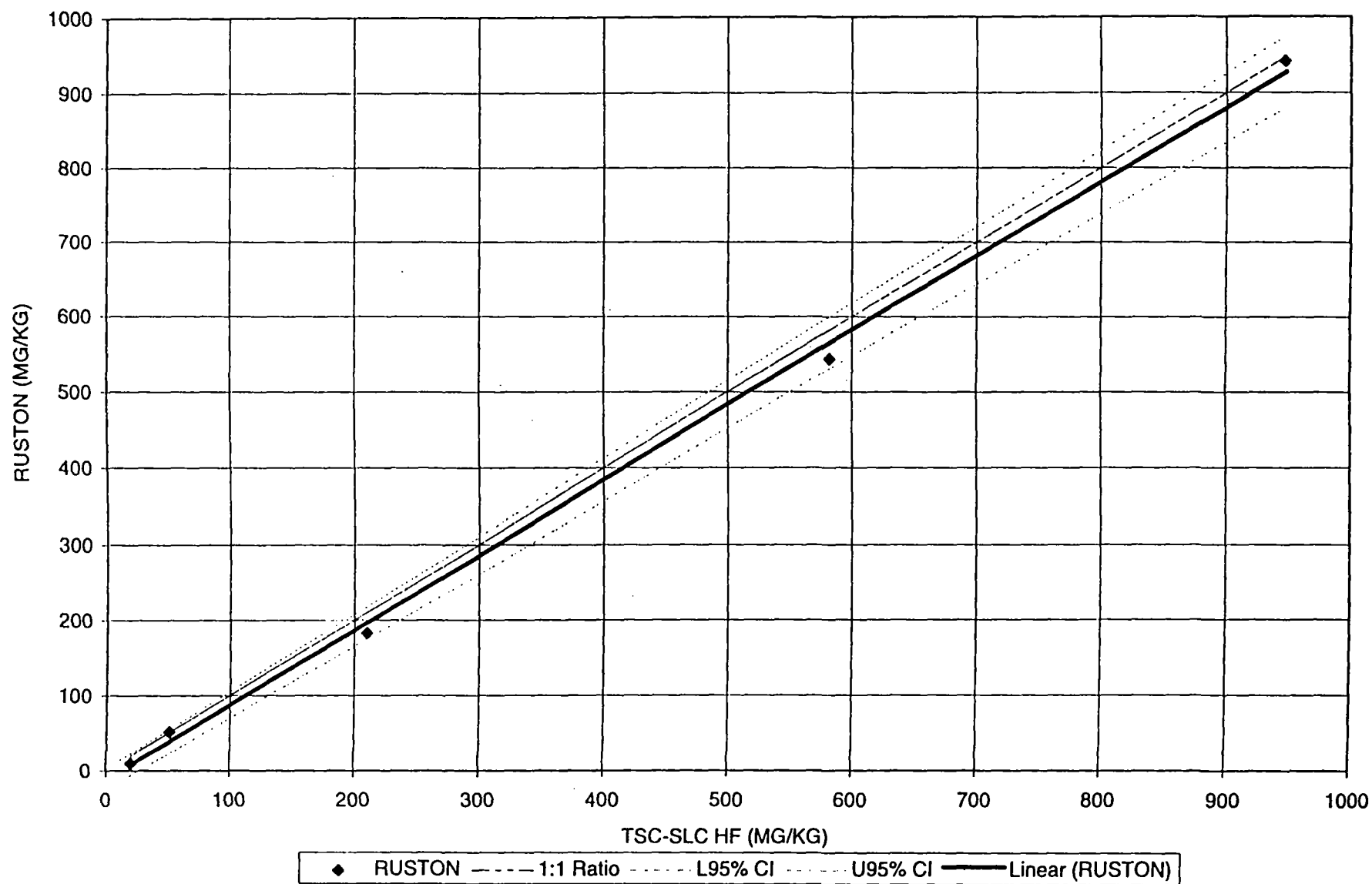
## t-Test: Paired Two Sample for Means

	TSC-SLC HF	RUSTON
Mean	233.75	220.125
Variance	120960.2143	118893.2679
Observations	8	8
Pearson Correlation	0.999373683	
Hypothesized Mean Difference	0	
df	7	
t Stat	3.055007608	
P(T<=t) one-tail	0.009226321	
t Critical one-tail	1.894577508	
P(T<=t) two-tail	0.018452642	
t Critical two-tail	2.36462256	

Descriptive Statistics	TSC-SLC HF	RUSTON
Mean	233.75	220.125
Standard Error	122.9635181	121.908402
Median	35.5	31
Mode	20	10
Standard Deviation	347.79335	344.809031
Sample Variance	120960.2143	118893.2679
Kurtosis	1.730973866	2.161812626
Skewness	1.629528316	1.710901553
Range	927	932
Minimum	20	10
Maximum	947	942
Sum	1870	1761
Count	8	8
Confidence Level(95.000%)	241.00371	238.9357236

# LEAD (PB) REGRESSION CHART

$$y = 0.9908x - 11.474$$
$$R^2 = 0.9987$$



## **Outlier and Completeness Evaluation**

## PARAMETER: AS

Precision Results: Total Number of Pairs: 4; Total Number of Outliers: 0; Number of Valid Pairs (k): 4; Dixon Q's Test Value: N/A; 90% t value: 2.353; 95% t value: 3.182; Completeness: 100.0%; Standard Deviation: 0.01; 10% Uncertainty: 2.32; 5% Uncertainty: 3.14; Mean Percentage RPD: 2.2%; Validation Detection Limit (VDL): 10.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC (HF) LAB NO	RUSTON (I) LAB NO	TSC-SLC (HF) RESULTS	RUSTON (I) RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
AS	EVT-9803-514	03/31/98	258-3726	98R-01111	47.0	47	0.0%	Yes	N/A	0  < 20
AS	EVT-9803-150	03/19/98	258-3722	98R-00827	12033.0	11897	1.1%	Yes	No	1.1%
AS	EVT-9803-376	03/23/98	258-3724	98R-00965	4750.0	4677	1.5%	Yes	No	1.5%
AS	EVT-9803-100	03/18/98	258-3721	98R-00777	9576.0	9388	2.0%	Yes	No	2.0%
AS	EVT-9803-125A	03/19/98	258-3723	98R-00887	97.0	101	4.0%	Yes	No	4.0%
AS	EVT-9804-306	04/08/98	258-3727	98R-01176	42.0	37	12.7%	Yes	N/A	5  < 20
AS	EVT-9803-424	03/25/98	258-3725	98R-01013	<18.0	13	32.3%	Yes	N/A	5  < 20
AS	EVT-9804-356	04/09/98	258-3728	98R-01225	31.0	20	43.1%	Yes	N/A	11  < 20

## PARAMETER: PB

Precision Results: Total Number of Pairs: 4; Total Number of Outliers: 0; Number of Valid Pairs (k): 4; Dixon Q's Test Value: N/A; 90% t value: 2.353; 95% t value: 3.182; Completeness: 100.0%; Standard Deviation: 0.05; 10% Uncertainty: 7.38; 5% Uncertainty: 9.98; Mean Percentage RPD: 5.7%; Validation Detection Limit (VDL): 10.0; Control limit: 35.0% RPD or for values less than 5 times VDL: the absolute value of the difference between results needs to be within 2 times the VDL.

CODE	SAMPLE NUMBER	SAMPLE DATE	TSC-SLC (HF) LAB NO	RUSTON ( ) LAB NO	TSC-SLC (HF) RESULTS	RUSTON ( ) RESULTS	RELATIVE PERCENT DIFFERENCE	WITHIN CONTROL LIMITS	OUTLIER	COMMENTS
PB	EVT-9803-376	03/23/98	258-3724	98R-00965	947.0	942	0.5%	Yes	No	0.5%
PB	EVT-9803-514	03/31/98	258-3726	98R-01111	51.0	52	1.9%	Yes	No	1.9%
PB	EVT-9803-100	03/18/98	258-3721	98R-00777	582.0	544	6.7%	Yes	No	6.7%
PB	EVT-9804-356	04/09/98	258-3728	98R-01225	210.0	183	13.7%	Yes	No	13.7%
PB	EVT-9803-150	03/19/98	258-3722	98R-00827	<20.0	< 10	66.7%	Yes	N/A	10  < 20
PB	EVT-9803-325A	03/19/98	258-3723	98R-00887	<20.0	< 10	66.7%	Yes	N/A	10  < 20
PB	EVT-9803-424	03/25/98	258-3725	98R-01013	<20.0	< 10	66.7%	Yes	N/A	10  < 20
PB	EVT-9804-306	04/08/98	258-3727	98R-01176	<20.0	< 10	66.7%	Yes	N/A	10  < 20

**APPENDIX E**  
**Results of Bioassay Tests**

## Parametrix, Inc.

Consultants in Engineering and Environmental Sciences

5808 Lake Washington Blvd. N.E. Suite 200 Kirkland, WA 98033-7350  
425-822-8880 • Fax: 425-889-8808



Mr. Steve Thompson  
Hydrometrics, Inc.  
950 Pacific Avenue, Suite 700  
Tacoma, Washington 98402

April 24, 1998  
55-2198-09 (01)

### SUBJECT: RESULTS OF ACUTE HAZARDOUS WASTE DESIGNATION TESTS

Dear Mr. Thompson:

Please find enclosed results of the 96-hour acute hazardous waste designation tests using rainbow trout, *Oncorhynchus mykiss*, conducted on ten samples provided by Hydrometrics, Inc. on 7 April 1998. Testing was initiated on 15 and 17 April 1998 in accordance with Washington State Department of Ecology Guidelines (Methods 80-12). The bioassays were conducted at the 10 mg/L and 100 mg/L concentrations in order to determine how the samples should be classified.


In summary, none of the ten samples exhibited any mortality at either concentration and should not be designated as extremely hazardous or dangerous waste. Testing was conducted concurrently with negative and positive control groups which met all acceptable test criteria. Copies of the raw data, reference toxicant results, and chain-of-custody form are also enclosed in this data package.

If you have any questions regarding the results of these tests, or are in need of further assistance, please contact me or Ms. Dayle Ormerod at (425) 822-8880.

Sincerely,

PARAMETRIX, INC.

Paul Stenhouse  
Project Manager

cc: D. Ormerod   
file



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## Summary of test conditions for static acute *O. mykiss* bioassay.

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Job Name: Hydrometrics, Inc.

Dates: 15-19 April 1998  
17-21 April 1998

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**Test Protocol:** *Washington State Department of Ecology Biological Testing Methods, for the Designation of Dangerous Waste, Publication # 80-12, revised August 1996.*

**Test Material:** Samples EVT-9803-129, EVT-9803-113, EVT-9803-116, EVT-9803-114, EVT-9803-107, EVT-9803-143, EVT-9803-132, EVT-9803-140, EVT-9803-122, and EVT-9803-135

**Test Organisms/Age:** *O. mykiss* (rainbow trout); 33 days from swim-up at test initiation for samples EVT-9803-132, EVT-9803-135, EVT-9803-122, EVT-9803-140, and EVT-9803-143; 35 days from swim-up for samples EVT-9803-116, EVT-9803-114, EVT-9803-113, EVT-9803-107, and EVT-9803-129

**Source:** Mt. Lassen Trout Farm, Red Bluff, California

**Loading Limit:** 0.8 g (wet weight) per liter of test solution

**Number/Container:** 10

**Volume/Container:** 12 liters

**Test Chambers:** 20 L High-density linear polyethylene containers

**Replicates:** Three

**Test Concentrations:** 10 and 100 mg/L

**Reference Toxicant:** Potassium chloride

**Test Duration:** 96 hours

**Control:** Natural spring water from Gold Creek Trout Farm, Woodinville, Washington

**Lighting:** Fluorescent bulbs (50-100 foot candles)

**Photoperiod:** 16 hours light; 8 hours dark

**Aeration:** None

**Renewal:** None

**Temperature:**  $12 \pm 1^{\circ}\text{C}$

**Chemical Data:** Dissolved oxygen, temperature, and pH measured at initiation of test and every 24 hours; hardness, alkalinity, and specific conductivity determined at each concentration

**Effect Measured:** Mortality

**Test Acceptability:** Control mortality  $\leq 10\%$

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## Summary of Results:

Sample	Percent Mortality		
	Control - Spun	10 mg/L	100 mg/L
EVT-9803-129	0	0	0
EVT-9803-113	0	0	0
EVT-9803-116	0	0	0
EVT-9803-114	0	0	0
EVT-9803-107	0	0	0
EVT-9803-143	0	0	0
EVT-9803-132	0	0	0
EVT-9803-140	0	0	0
EVT-9803-122	0	0	0
EVT-9803-135	0	0	0
Reference Toxicant LC50 =		2.1 g/L KCl	

*Oncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Sample Number: EVT 9803 132, EVT 9803 135

Test Initiation Date: 4/5/98 Time: 1500

Source of Organisms: Mr. Lassen Trout Farm

Client: Hydrometrics

Age of Organisms: 383 days from swim up

Conc.	Rep.	Number of Survivors					Test Volume: 12	L
		0 hours	24 hours	48 hours	72 hours	96 hours	Mean Control Fish Weight:	902 mg
Control (spun)	A	10	10	10	10	10	1. 3.6 2. 4.0 3. 4.1 4. 3.4 5. 4.2 6. 3.8	
	B	10	10	10	10	10	7. 3.8 8. 4.0 9. 4.1 10. 3.6 Mean = 3.86 cm	
	C	10	10	10	10	10	Concentration Alkalinity Hardness	
10 mg/L -132	A	10	10	10	10	10	Cont. (spun) 60	78
	B	10	10	10	10	10	10 <sup>-132</sup> mg/L 62	76
	C	10	10	10	10	10	100 mg/L 62	78
100 mg/L -132	A	10	10	10	10	10	10 <sup>-135</sup> mg/L 62	80
	B	10	10	10	10	10	100 mg/L 60	78
	C	10	10	10	10	10	Comments:	
10 mg/L -135	A	10	10	10	10	10		
	B	10	10	10	10	10		
	C	10	10	10	10	10		
100 mg/L -135	A	10	10	10	10	10		
	B	10	10	10	10	10		
	C	10	10	10	10	10		
Initials		JP	SH	PS	PS	JL		
Date		4/15	4/16	4/17	4/18	4/19		

*D. Allen*

*Uncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Client: Hydrometrix

Test Initiation Date: 4/15/98

Sample Number: EVT 9803 132, EVT 9803 135

Temperature (°C) 0 hr 13 24 hrs 12 48 hrs 12 72 hrs 12 96 hrs 12

Concentration	Rep.	pH (°C)					Dissolved Oxygen (mg/L)					Conductivity (µMHOS)	
		Time in Hours					Time in Hours					Time in Hours	
		0	24	48	72	96	0	24	48	72	96	0	96
Control (spun)	A	7.7	7.8	7.7	7.2	7.4	10.3	9.0	9.0	9.1	9.2	184	192
	B	7.7	7.7	7.7	7.3	7.5	10.2	9.0	9.82	9.3	9.2	186	194
	C	7.8	7.7	7.7	7.3	7.5	10.3	8.9	9.2	9.3	9.1	186	194
10 mg/L 132	A	7.9	7.6	7.7	7.2	7.6	10.3	8.9	9.2	9.2	9.0	192	196
	B	7.8	7.6	7.7	7.2	7.6	9.3	8.7	9.2	9.2	9.0	204	209
	C	7.9	7.7	7.7	7.3	7.6	10.3	8.9	9.2	9.1	9.1	185	189
100 mg/L 132	A	7.9	7.6	7.7	7.3	7.6	10.1	8.7	9.1	9.2	9.0	192 MB	197
	B	7.829	7.6	7.7	7.3	7.6	10.1	8.7	9.0	9.0	9.0	192	196
	C	7.9	7.6	7.7	7.3	7.6	10.1	8.7	9.1	9.0	9.1	192	196
10 mg/L 135	A	7.9	7.6	7.7	7.3	7.6	10.3	8.8	9.3	9.2	9.2	185	191
	B	7.9	7.6	7.7	7.3	7.6	10.1	8.7	9.3	9.2	9.2	192	196
	C	7.9	7.6	7.7	7.3	7.6	10.3	8.8	9.1	9.1	9.0	186	190
100 mg/L 135	A	7.9	7.6	7.7	7.3	7.6	10.2	8.8	9.1	9.1	9.0	185	199
	B	7.9	7.6	7.7	7.3	7.6	10.3	8.8	9.0	9.0	8.8	185	199
	C	7.9	7.6	7.7	7.3	7.6	10.2	8.5	8.8	8.9	9.0	193	195
	Initials	DH	DH	PS	PS	JK	DH	DH	PS	PS	JK	DH	JK
	Date	4/15	4/16	4/17	4/18	4/19	4/15	4/16	4/17	4/18	4/19	4/15	4/19

*DH*

*Oncorhynchus mykiss* EVT 9803

Test Type: Static Acute Trout Hazardous Waste (80-12)

Sample Number: 122

Test Initiation Date: 4/15/98 Time: 1515

Source of Organisms: Mt. Lassen Trout Farm

Client: Hydrometris

Age of Organisms: 33 days from swim up

Conc.	Rep.	Number of Survivors				
		0 hours	24 hours	48 hours	72 hours	96 hours
Control (spun)	A	10	10	10	10	10
	B	10	10	10	10	10
	C	10	10	10	10	10
10 mg/L 122	A	10	10	10	10	10
	B	10	10	10	10	10
	C	10	10	10	10	10
100 mg/L 122	A	10	10	10	10	10
	B	10	10	10	10	10
	C	10	10	10	10	10
	Initials	JP	DA	PS	PS	JK
	Date	4/15	4/16	4/17	4/18	4/19

Fish Length Range:

MAX: 4.2 cm

MIN: 3.4 cm

Volume: 12 L

Comments: MEAN FISH WT 902 mg

Control fish lengths: (cm) 3.6 | 4.0 | 4.1 | 3.4 | 4.2 | 3.8 | 3.8 | 4.0 | 4.1 | 3.6 | Mean = 3.86 cm

Analysis	Control (spun)	10 mg/L	100 mg/L
Hardness	78	72	74
Alkalinity	60	58	58

A H

*Oncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Client: Hydrometrics

Test Initiation Date: 4/15/98

Sample Number: EVT 9803 122

Temperature (°C) 0 hr 13 24 hrs 12 48 hrs 12 72 hrs 12 96 hrs 12

Concentration	Rep.	pH (°C)					Dissolved Oxygen (mg/L)					Specific Conductivity (µMHOS)	
		Time in Hours					Time in Hours					Time in Hours	
		0	24	48	72	96	0	24	48	72	96	0	96
Control (spun)	A	7.7	7.8	7.7	7.2	7.4	10.3	9.0	9.0	9.1	9.2	184	192
	B	7.7	7.7	7.7	7.3	7.5	10.2	9.0	9.2	9.3	9.2	186	194
	C	7.8	7.7	7.7	7.3	7.5	10.3	8.9	9.2	9.3	9.1	186	194
10 mg/L 122	A	8.0	7.7	7.7	7.2	7.7	10.3	8.8	9.3	9.3	9.3	184	188
	B	7.9	7.7	7.8	7.2	7.6	10.3	8.8	9.2	9.2	9.2	185	188
	C	7.9	7.6	7.8	7.3	7.6	10.3	8.9	9.3	9.2	9.2	185	188
100 mg/L 122	A	7.7	7.6	7.7	7.3	7.6	9.2	8.6	9.3	9.2	9.0	203	207
	B	7.8	7.6	7.7	7.3	7.6	10.0	8.6	9.1	9.1	8.9	186	168
	C	7.9	7.6	7.7	7.3	7.6	10.3	8.7	9.0	9.0	9.0	187	190
Initials		DH	DH	PS	PS	JK	DH	DH	PS	PS	JK	DH	JK
Date		4/15	4/16	4/17	4/18	4/19	4/15	4/16	4/17	4/18	4/19	4/15	4/16

Comments:

DH

*Oncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Sample Number: EVT 9803 140, EVT 9803 143

Test Initiation Date: 4/15/98 Time: 1515

Source of Organisms: Mt. Lassen Trout Farm

Client: Hydrometries

Age of Organisms: 383 days from swim up

Conc.	Rep.	Number of Survivors					Test Volume: 12	L
		0 hours	24 hours	48 hours	72 hours	96 hours	Mean Control Fish Weight:	902 mg
Control (spun)	A	10	10	10	10	10	1. 3.6 2. 4.0 3. 4.1 4. 3.4 5. 4.2 6. 3.8	
	B	10	10	10	10	10	7. 3.8 8. 4.0 9. 4.1 10. 3.6 Mean = 3.86 cm	
	C	10	10	10	10	10	Concentration Alkalinity Hardness	
10 mg/L -140	A	10	10	10	10	10	Cont. (spun) 60 78	
	B	10	10	10	10	10	<sup>-140</sup> 10 mg/L 70 82	
	C	10	10	10	10	10	100 mg/L 60 80	
100 mg/L -140	A	10	10	10	10	10	<sup>-143</sup> 10 mg/L 64 78	
	B	10	10	10	10	10	100 mg/L 66 82	
	C	10	10	10	10	10	Comments:	
10 mg/L -143	A	10	10	10	10	10		
	B	10	10	10	10	10		
	C	10	10	10	10	10		
100 mg/L -143	A	10	10	10	10	10		
	B	10	10	10	10	10		
	C	10	10	10	10	10		
Initials		JS	DA	PS	PS	JK		
Date		4/15	4/16	4/17	4/18	4/19		

*DA*

*Oncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Client: Hydrometrics

Test Initiation Date: 4/15/98

Sample Number: ~~140, 143~~ ~~OK~~ EVT 9803 140, EVT 9803 143

Temperature (°C) 0 hr 13 24 hrs 12 48 hrs 12 72 hrs 12 96 hrs 12

Concentration	Rep.	pH (°C)					Dissolved Oxygen (mg/L)					Conductivity (µMHOS)	
		Time in Hours					Time in Hours					Time in Hours	
		0	24	48	72	96	0	24	48	72	96	0	96
Control (spun)	A	7.7	7.8	7.7	7.2	7.4	10.3	9.0	9.0	9.1	9.2	184	192
	B	7.7	7.7	7.7	7.3	7.5	10.2	9.0	9.2	9.3	9.2	186	194
	C	7.8	7.7	7.7	7.3	7.5	10.3	8.9	9.2	9.3	9.1	186	194
10 mg/L 140	A	8.0	7.7	7.7	7.3	7.6	10.2	8.9	8.7	8.9	9.0	185	190
	B	8.0	7.7	7.7	7.3	7.6	10.2	8.8	9.2	9.2	9.0	192	196
	C	7.9	7.7	7.7	7.3	7.6	10.3	9.0	9.2	8.9	9.2	185	188
100 mg/L 140	A	7.9	7.6	7.7	7.3	7.6	10.3	8.9	9.2	9.3	9.1	185	188
	B	7.7	7.5	7.7	7.3	7.6	9.2	8.7	9.2	9.3	9.1	205	207
	C	7.8	7.6	7.7	7.3	7.6	10.3	8.8	9.1	9.2	9.1	193	194
10 mg/L 143	A	7.9	7.7	7.7	7.2	7.6	10.2	8.9	9.4	9.4	9.2	192	196
	B	7.9	7.7	7.8	7.2	7.6	10.1	8.8	9.4	9.3	9.3	193	199
	C	8.1	7.7	7.8	7.3	7.6	10.3	8.8	8.9	8.9	9.2	187	198
100 mg/L 143	A	7.9	7.6	7.8	7.3	7.6	10.1	8.5	9.0	8.9	9.0	193	190
	B	7.9	7.6	7.7	7.3	7.6	10.1	8.7	9.3	9.2	9.1	193	196
	C	8.1	7.6	7.7	7.3	7.6	10.3	8.8	9.2	9.2	9.2	187	191
	Initials	DH	DH	PS	PS	JK	DH	DH	PS	PS	SK	DH	JK
	Date	4/15	4/16	4/17	4/18	4/19	4/15	4/16	4/17	4/18	4/19	4/15	4/19

DH

*Oncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Sample Number: EJT-9803-116

Test Initiation Date: 4/17/98 Time: 1200

Source of Organisms: MT LASSEN TROUT FARM

Client: Hydrometrix

Age of Organisms: 35 DAYS FROM SWIMUP

Conc.	Rep.	Number of Survivors				
		0 hours	24 hours	48 hours	72 hours	96 hours
Control (spun)	A	10	10	10	10	10
	B	10	10	10	10	10
	C	10	10	10	10	10
10 mg/L 116	A	10	10	10	10	10
	B	10	10	10	10	10
	C	10	10	10	10	10
100 mg/L 116	A	10	10	10	10	10
	B	10	10	10	10	10
	C	10	10	10	10	10
Initials		JL	PS	JL	PS	JL
Date		4/17	4/18	4/19	4/20	4/21

Fish Length Range:  
MAX: 4.2 cm  
MIN: 3.4 cm  
VOLUME = 12 L  
Comments: MEAN FISH WT = 902 mg

Control fish lengths: (cm) 3.6 | 4.0 | 4.1 | 3.4 | 4.2 | 3.8 | 3.8 | 4.0 | 4.1 | 3.6 | Mean = 3.86 cm

Analysis	Control (spun)	10 mg/L	100 mg/L
Hardness	78	70	76
Alkalinity	60	58	62

D.K.

*Oncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Client: Hychrometrics

Test Initiation Date: 4/17/98

Sample Number: EV-9803-116

Temperature (°C) 0 hr 12 24 hrs 12 48 hrs 12 72 hrs 12 96 hrs 12

		pH (°C)					Dissolved Oxygen (mg/L)					Specific Conductivity (µMHOS)	
		Time in Hours					Time in Hours					Time in Hours	
Concentration	Rep.	0	24	48	72	96	0	24	48	72	96	0	96
Control (spun)	A	7.6	7.6	7.6	7.5	7.5	10.5	9.2	9.1	7.6	9.2	184	186
	B	7.6	7.6	7.6	7.5	7.4	<del>10.6</del> <sup>10.6</sup>	9.2	9.2	8.0	9.4	185	187
	C	7.6	7.5	7.6	7.5	7.3	<del>10.5</del> <sup>10.5</sup>	9.2	9.2	7.6	9.3	185	188
10 mg/L <u>116</u>	A	7.8	7.3	7.7	7.6	7.5	10.5	8.5	8.2	7.6	8.7	185	194
	B	7.8	7.3	7.7	7.6	7.5	10.5	9.0	8.7	7.5	8.8	186	191
	C	7.8	7.3	7.7	7.6	7.5	10.5	8.9	8.7	7.0	8.8	186	190
100 mg/L <u>116</u>	A	7.8	7.3	7.7	7.6	7.6	10.5	8.6	7.8	6.8	8.8	185	191
	B	7.8	7.3	7.6	7.6	7.6	10.5	8.3	7.8	6.4	8.6	185	190
	C	7.8	7.3	7.6	7.6	7.5	10.5	9.0	8.6	6.9	8.7	185	190
	Initials	<u>JK</u>	<u>PS</u>	<u>JK</u>	<u>PS</u>	<u>JK</u>	<u>JK</u>	<u>PS</u>	<u>JK</u>	<u>PS</u>	<u>JK</u>	<u>JK</u>	<u>JK</u>
	Date	<u>4/17</u>	<u>4/18</u>	<u>4/19</u>	<u>4/20</u>	<u>4/21</u>	<u>4/17</u>	<u>4/18</u>	<u>4/19</u>	<u>4/20</u>	<u>4/21</u>	<u>4/17</u>	<u>4/21</u>

Comments:

**Oncorhynchus mykiss**

Test Type: Static Acute Trout Hazardous Waste (80-12)

Sample Number: EVT-9803-114, EVT-9803-113

Test Initiation Date: 4/17/98 Time: 1200

Source of Organisms: MT LASSEN TROUT FARM

Client: Hychonometrics

Age of Organisms: 35 DAYS FROM SWIMUP

Conc.	Rep.	Number of Survivors					Test Volume:	12	L
		0 hours	24 hours	48 hours	72 hours	96 hours	Mean Control Fish Weight:	902	mg
Control (spun)	A	10	10	10	10	10	1. 3.6 2. 4.0 3. 4.1 4. 3.4 5. 4.2 6. 3.8		
	B	10	10	10	10	10	7. 3.8 8. 4.0 9. 4.1 10. 3.6 Mean=3.86 cm		
	C	10	10	10	10	10	Concentration	Alkalinity	Hardness
10 mg/L 114	A	10	10	10	10	10	Cont. (spun)	60	78
	B	10	10	10	10	10	10 <sup>114</sup> mg/L	70	78 <sup>8</sup>
	C	10	10	10	10	10	100 mg/L	70	76
100 mg/L 114	A	10	10	10	10	10	10 <sup>113</sup> mg/L	62	880
	B	10	10	10	10	10	100 mg/L	64	784
	C	10	10	10	10	10	Comments:		
10 mg/L 113	A	10	10	10	10	10			
	B	10	10	10	10	10			
	C	10	10	10	10	10			
100 mg/L 113	A	10	10	10	10	10			
	B	10	10	10	10	10			
	C	10	10	10	10	10			
Initials		JL	PS	JL	PS	267			
Date		4/17	4/18	4/19	4/20	4/21			

*Dike*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Client: Hydrometries

Test Initiation Date: 4/17/94

Sample Number: EVT-9803-114, EVT-9803-113

Temperature (°C) 0 hr 12 24 hrs 12 48 hrs 12 72 hrs 12 96 hrs 12

Concentration	Rep.	pH (°C)					Dissolved Oxygen (mg/L)					Conductivity (µMHOS)	
		Time in Hours					Time in Hours					Time in Hours	
		0	24	48	72	96	0	24	48	72	96	0	96
Control (spun)	A	7.6	7.6	7.6	7.5	7.5	10.5	9.2	9.1	7.6	9.2	184	186
	B	7.6	7.4	7.6	7.5	7.4	10.6	9.2	9.2	8.0	9.4	185	187
	C	7.6	7.5	7.6	7.5	7.3	10.6	9.2	9.2	7.6	9.3	185	188
10 mg/L 114	A	7.8	7.4	7.7	7.6	7.6	10.6	9.5	9.6	7.4	8.9	185	194
	B	7.8	7.4	7.7	7.6	7.6	10.6	9.3	9.6	7.8	8.7	185	190
	C	7.8	7.4	7.7	7.6	7.6	10.6	9.1	9.5	7.3	8.7	185	190
100 mg/L 114	A	7.8	7.4	7.7	7.6	7.6	10.6	9.2	9.2	7.2	8.9	185	189
	B	7.8	7.4	7.7	7.6	7.6	10.6	9.2	9.2	7.9	9.5	185	190
	C	7.8	7.4	7.7	7.6	7.6	10.6	9.1	9.0	7.7	9.4	185	190
10 mg/L 113	A	7.8	7.3	7.6	7.6	7.5	10.6	9.1	8.9	7.4	8.7	184	190
	B	7.8	7.3	7.6	7.6	7.5	10.6	8.6	8.4	7.4	8.7	185	190
	C	7.8	7.3	7.6	7.6	7.5	10.5	8.6	8.4	7.4	8.7	185	191
100 mg/L 113	A	7.8	7.3	7.6	7.6	7.5	10.5	9.0	9.0	7.4	8.8	185	189
	B	7.8	7.3	7.6	7.6	7.5	10.5	8.5	9.0	7.8	8.4	185	189
	C	7.8	7.3	7.6	7.6	7.5	10.5	8.7	8.6	7.0	8.6	185	189
	Initials	JK	PS	JK	PS	JP	JK	PS	JK	PS	JP	JK	JP
	Date	4/17	4/18	4/19	4/20	4/21	4/17	4/18	4/19	4/20	4/21	4/17	4/21

*D. H. H.*

*Oncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Sample Number: EVT-9803-107 , EVT-9803-129Test Initiation Date: 4/17/98 Time: 1200Source of Organisms: MT LASSEN TROUT FARMClient: HydrometricsAge of Organisms: 35 DAYS FROM SWIMUP

Conc.	Rep.	Number of Survivors					Test Volume:
		0 hours	24 hours	48 hours	72 hours	96 hours	12 L
Control (spun)	A	10	10	10	10	10	Mean Control Fish Weight: 902 mg
	B	10	10	10	10	10	1. 3.6 2. 4.0 3. 4.1 4. 3.4 5. 4.2 6. 3.8
	C	10	10	10	10	10	7. 3.8 8. 4.0 9. 4.1 10. 3.6 Mean = 3.86 cm
10 mg/L 107	A	10	10	10	10	10	Concentration Alkalinity Hardness
	B	10	10	10	10	10	Cont. (spun) 60 78
	C	10	10	10	10	10	10 mg/L 60 74
100 mg/L 107	A	10	10	10	10	10	100 mg/L 66 72
	B	10	10	10	10	10	10 <sup>-107</sup> mg/L 64 80
	C	10	10	10	10	10	100 mg/L 72 76
10 mg/L 129	A	10	10	10	10	10	Comments:
	B	10	10	10	10	10	
	C	10	10	10	10	10	
100 mg/L 129	A	10	10	10	10	10	
	B	10	10	10	10	10	
	C	10	10	10	10	10	
Initials		JK	PS	JK	PS	JN	
Date		4/17	4/18	4/19	4/20	4/21	

DHE

*Oncorhynchus mykiss*

Test Type: Static Acute Trout Hazardous Waste (80-12)

Client: Hydrometrics

Test Initiation Date: 4/17/98

Sample Number: EVT-9803-107, EVT-9803-129

Temperature (°C) 0 hr 12 24 hrs 12 48 hrs 12 72 hrs 12 96 hrs 12

Concentration	Rep.	pH (°C)					Dissolved Oxygen (mg/L)					Conductivity (µMHOS)	
		Time in Hours					Time in Hours					Time in Hours	
		0	24	48	72	96	0	24	48	72	96	0	96
Control (spun)	A	7.6	7.6	7.6	7.5	7.5	10.5	9.2	9.1	7.6	9.2	184	186
	B	7.6	7.6	7.6	7.5	7.4	10.6	9.2	9.2	8.0	9.4	185	187
	C	7.6	7.5	7.4	7.5	7.3	10.6	9.2	9.2	7.6	9.3	185	188
10 mg/L 107	A	7.7	7.3	7.7	7.5	7.8	10.6	9.6	9.7	7.9	9.3	185	198
	B	7.7	7.3	7.7	7.5	7.8	10.6	9.6	9.7	7.5	9.4	185	197
	C	7.7	7.3	7.7	7.5	7.8	10.6	9.5	9.6	7.6	9.4	185	198
100 mg/L 107	A	7.7	7.3	7.7	7.5	7.8	10.6	9.5	9.7	7.9	9.7	184	193
	B	7.7	7.4	7.7	7.6	7.8	10.6	9.3	9.6	7.6	9.5	184	193
	C	7.7	7.4	7.7	7.6	7.8	10.6	9.4	9.5	8.2	9.4	185	192
10 mg/L 129	A	7.8	7.3	7.7	7.6	7.8	10.6	9.3	9.3	8.2	9.6	185	194
	B	7.8	7.3	7.7	7.6	7.7	10.6	9.1	9.4	7.8	9.5	185	193
	C	7.8	7.3	7.7	7.6	7.7	10.6	9.0	9.2	7.4	9.4	185	192
100 mg/L 129	A	7.8	7.3	7.7	7.5	7.7	10.6	9.0	9.0	7.0	9.3	185	192
	B	7.8	7.3	7.6	7.5	7.6	10.6	8.7	9.0	7.4	9.4	189	312
	C	7.8	7.4	7.6	7.5	7.7	10.6	9.2	8.9	7.2	8.8	185	196
Initials		JK	PS	JK	PS	JP	JK	PS	JK	PS	JP	JK	JP
Date		4/17	4/18	4/19	4/20	4/21	4/17	4/18	4/19	4/20	4/21	4/17	4/21

*JK*

ACUTE *Oncorhynchus mykiss* REFERENCE TOXICANT TEST

Toxicant KCl  
Dilution Water NATURAL SPRING WATER  
Source of Organisms MT LASSEN TROUT FARM

Test Dates 4/14/98 - 4/18/98  
Age of Organisms 3 1/2 DAYS FRY SWIMUP

Temp (°C) Day 0 12 Day 1 12 Day 2 12 Day 3 12 Day 4 12

Conc.	Rep	No. of Survivors					pH					Dissolved Oxygen (mg/L)					Specific Conductivity (µS)	
		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
Control	A	10	10	10	10	10	7.8	7.5	7.6	7.7	7.3	10.4	9.4	8.8	8.7	9.5	180	201
	B	10	10	10	10	10												
1.2g/L	A	10	10	10	10	10	7.4	7.2	7.3	7.2	7.4	10.4	9.2	8.8	8.8	9.1	2410	2420
	B	10	10	10	10	10												
1.75g/L	A	10	10	10	10	10	7.7	7.3	7.3	7.3	7.4	10.4	9.2	8.7	8.8	9.0	3300	3310
	B	10	10	10	10	10												
2.45g/L	A	10	0-10	0	0	0	7.8	7.4	7.3	7.3	7.5	10.4	9.9	8.5	8.8	10.2	4720	4750
	B	10	2-8	2	2	2												
3.5g/L	A	10	0-10	0	0	0	7.8	7.4	-	-	-	10.4	9.7	-	-	-	6920	6860
	B	10	0-10	0	0	0												
5.0g/L	A	10	0-10	0	0	0	7.8	7.4	-	-	-	10.4	9.6	-	-	-	8970	8990
	B	10	0-10	0	0	0												
	A																	
	B																	
Initials		JP	JK	JK	PS	PS	JK	JK	JK	PS	PS	JK	JK	PS	PS	PS		
Date		4/14	4/15	4/16	4/17	4/18	4/14	4/15	4/16	4/17	4/18	4/14	4/15	4/16	4/17	4/18	4/14	4/18

Comments Taken at 24 hrs for 4/15

*Signature*

## Parametrix Toxicology Laboratory

## FISH TEST DATA

Test Number: REFTOX848

( ) Chronic (x) Acute 96 hours

Test Date: 14-Apr-98

Source: REF

Test Material: KCL (g/l)

Conc	Rep	Cont. No.	Start	Daily Survival						Prop Alive	Weight /Fish
				1	2	3	4	5	6 End		
0.00	D	1	10				10			1.00	
0.00	D	2	10				10			1.00	
1.20	D	1	10				10			1.00	
1.20	D	2	10				10			1.00	
1.72	D	1	10				10			1.00	
1.72	D	2	10				10			1.00	
2.45	D	1	10				0			0.00	
2.45	D	2	10				2			.20	
3.50	D	1	10				0			0.00	
3.50	D	2	10				0			0.00	
5.00	D	1	10				0			0.00	
5.00	D	2	10				0			0.00	

Parametrix Toxicology Laboratory

Test Date: 4/14/98  
 Sample Date: 4/14/98  
 Species: Oncorhynchus mykiss  
 Test Type: Acute - 96 hours

Test Number: REFTOX848  
 Test Material: Potassium chloride g/l  
 Source: REF  
 Reference Toxicant

SUMMARY

End Point	Day	Transformation	Conc	#Reps	Mean	StDev	% Surv
Proportion Alive	4	Arc sine sqrt w/ adj.					
		X	0.000 D	2	1.41	0.000	
		X	1.200 D	2	1.41	0.000	
		X	1.715 D	2	1.41	0.000	
		X	2.450 D	2	.31	.216	
			3.500 D	2	.16	0.000	
			5.000 D	2	.16	0.000	
Proportion Alive	4	No transformation					
			0.000 D	2	1.00	0.000	
			1.200 D	2	1.00	0.000	
			1.715 D	2	1.00	0.000	
			2.450 D	2	.10	.141	
			3.500 D	2	0.00	0.000	
			5.000 D	2	0.00	0.000	

X = indicates concentrations used in calculations

- HYPOTHESIS TEST -

End Point	Day	Transformation/Analysis	NOEC	LOEC	TU	MSE	MSD
Proportion Alive	4	Arc sine sqrt w/ adj. Dunnett + t-test				.008	

- PROPORTION POINT ESTIMATE -

End Point	Day	Method	P	Conc	95% CI	TU
Proportion Alive	4	Spearman-Kärber	EC 50	2.124	2.03 - 2.23	

4/21/98- 1:24 pm

# TOXIS ANALYSIS SUMMARY

sh Larvae

ab	Species	Test Date	Test Material	Permit	Protocol	Test Number
WAPTL	OM	4/14/98	KCL (g/l)	REF	EPAA 91	REFTOX848

## Statistics Parameters

### PROPORTION

End Point:	PA Proportion Alive	
Analysis:	EPA Flowchart (Chronic and Acute)	1 control
Transform:	Arc sine square root w/ Bartlett adj.	
Tail:	One-tailed, decreasing	
Constant:	-.01	Variance: .01
Root:	-1.00	Alpha Normality: .01
		NOEC: .05

EC/LC Method: F (P,S,G,L,N)

Superdunnet: 4000

### GROWTH

End Point:	GW Weight	
Analysis:	No Analysis	
Transform:		
Tail:		
Constant:	.01	Variance: .01
Root:		Alpha Normality: .01
		NOEC: .05

calculate IC? N (Y,N)

IC resamples: 120

## Errors/Warnings

Type Number

EC/LC 0 Analysis completed with no errors

OP 44 Not enough replication for Steel test

# Spearman-Kärber Analysis for EC/LC 50

Parametrix Toxicology Laboratory

Species: *Oncorhynchus mykiss*  
Test Material: Potassium chloride (  
Endpoint: Prop

Test Number: REFTOX848  
Test Date: 4/14/98

Conc	Number Exposed	Mortalities
0.00	20	0
1.20	20	0
1.72	20	0
2.45	20	18
3.50	20	20
5.00	20	20

Spearman-Kärber EC/LC 50 estimate: 2.124  
95% lower confidence: 2.025  
95% upper confidence: 2.228

Trimmed Spearman-Kärber

4/21/98

# TOXIS ANALYSIS SUMMARY

Fish Larvae		Proportion Alive				Day 4
Lab	Species	Date	Test Material	Permit	Protocol	Test Number
WAPTL	OM	4/14/98	KCL (g/l)	REF	EPAA 91	REFTOX848

PA Flowchart (Chronic and Acute)	1 control
----------------------------------	-----------

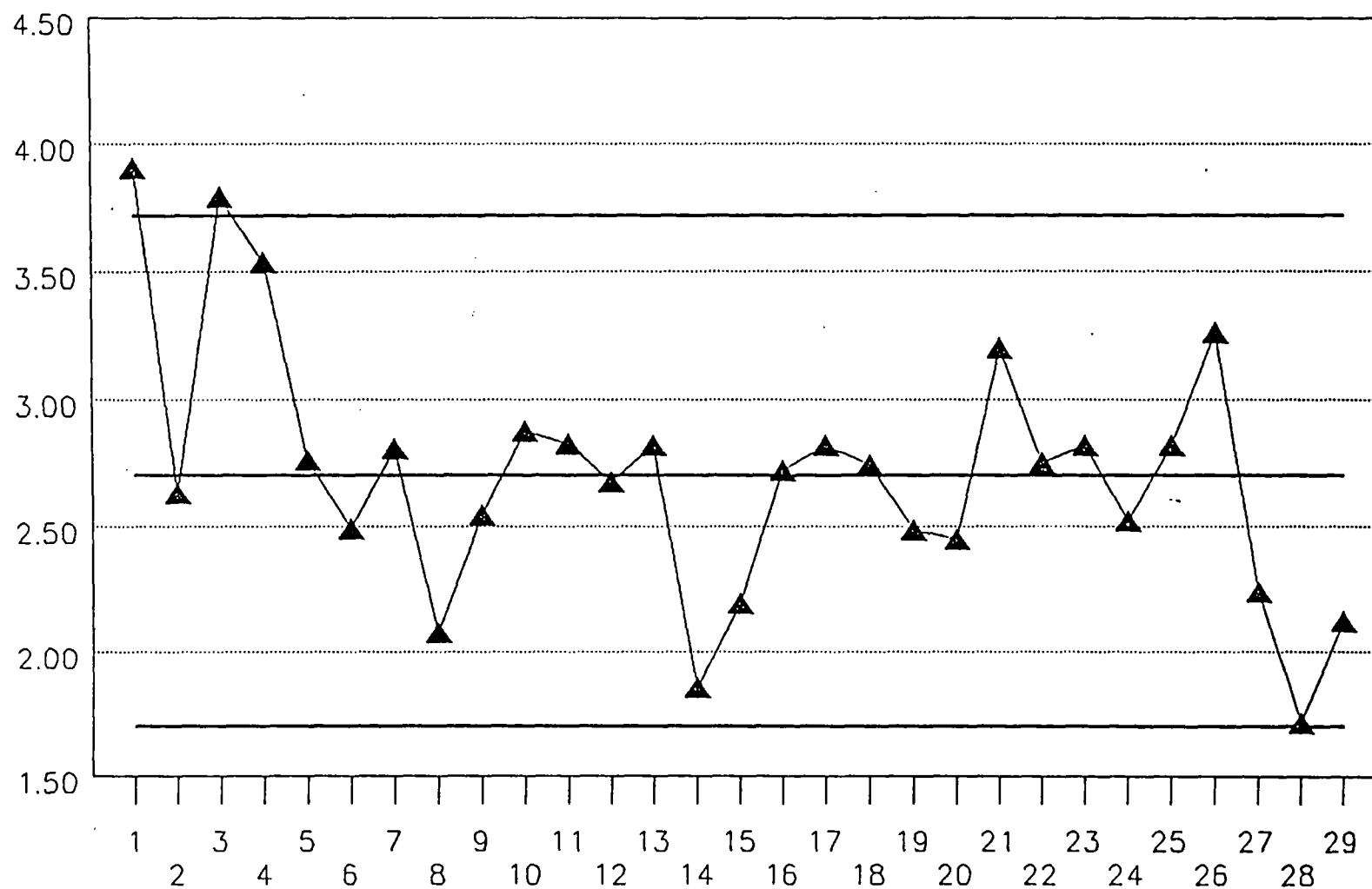
Transformation		Conc	Mean	SD	N
Arc sine sqrt w/ adj.	X	0.00D	1.41	0.000	2
	X	1.20D	1.41	0.000	2
	X	1.72D	1.41	0.000	2
	X	2.45D	.31	.216	2
		3.50D	.16	0.000	2
		5.00D	.16	0.000	2
No transformation		0.00D	1.00	0.000	2
		1.20D	1.00	0.000	2
		1.72D	1.00	0.000	2
		2.45D	.10	.141	2
		3.50D	0.00	0.000	2
		5.00D	0.00	0.000	2

error occurred during statistics:

not enough replication for Steel test

# CONTROL CHART

Oncorhynchus mykiss/Potassium chloride



From 7/04/97 to 4/14/98

PROJ. NO.		PROJECT NAME		NO. OF CONTAINERS		REMARKS							
SAMPLERS: (Signature)													
STAT. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION								
	3-14-98	0846		X	EVT-9803-129	1	X						
	3-18-98	1202		X	EVT-9803-113	1	X						
	3-18-98	1208		X	EVT-9803-116	1	X						
	3-18-98	1204		X	EVT-9803-114	1	X						
	3-18-98	1025		X	EVT-9803-107	1	X						
	3-19-98	1350		X	EVT-9803-143	1	X						
	3-19-98	1022		X	EVT-9803-132	1	X						
	3-19-98	1344		X	EVT-9803-140	1	X						
	3-18-98	1546		X	EVT-9803-122	1	X						
	3-19-98	1028		X	EVT-9803-135	1	X						
Relinquished (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)			
Sig. Uhl		4-7-98 1130		H. M. L.		H. M. L.		4-7-98 1125		Anna M. Echeverria			
Relinquished (Signature)		Date/Time		Received by: (Signature)		Relinquished by: (Signature)		Date/Time		Received by: (Signature)			
Relinquished (Signature)		Date/Time		Received for Laboratory by: (Signature)		Date/Time		Remarks					
Split Samples:						<input type="checkbox"/> Accepted <input type="checkbox"/> Declined							
						Signature							

**APPENDIX F**  
**Previous TCLP Study**

# ASARCO

Thomas L. Aldrich  
Site Manager  
Tacoma Plant

July 12, 1996

Mr. Dave Nazy, Site Manager  
Toxics Cleanup Program  
Department of Ecology  
3190 160th Ave SE  
Bellevue, WA 98008

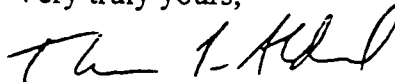
Dear Dave:

Attached are the laboratory results for 22 soil samples comprising the TCLP arsenic criterion for soils in the Everett Smelter Site area. The samples were analyzed at Asarco's Technical Services Laboratory in Salt Lake City, Utah for total and TCLP arsenic. The laboratory reports and a table illustrating the total and TCLP relationship are attached.

A diagram is also attached that shows the plot of a regression line generated from the laboratory results. Per Ecology's guidance, a total soil concentration of 3,000 ppm of arsenic corresponding to the upper 95% confidence limit has been calculated as a threshold concentration above which soils might exceed the TCLP standard of 5 ppm. Please note that as circumstances dictate, Asarco may verify these soils as federal hazardous waste with actual laboratory analyses.

Please call Steve Thompson of Hydrometrics at (206) 572-5481 if you have any questions regarding the results of the TCLP criterion for arsenic.

Very truly yours,



Thomas L. Aldrich  
Site Manager

cc: Polly McNeill - Heller Ehrman, White & McAuliffe, Seattle, WA  
Mike Thorp - Heller Ehrman, White & McAuliffe, Tacoma, WA  
Steve Thompson - Hydrometrics, Inc.

Attachments

TABLE 1

ARSENIC CONCENTRATIONS IN PARTS PER MILLION				
Total As from				
Sample Number	Method 6010		TCLP As	
EVT-9512-913	1449		1.80	
EVT-9512-920	626		0.61	
EVT-9512-927	668		0.48	
EVT-9512-932	957		0.29	
EVT-9512-903	865		1.10	
EVT-9512-910	884		0.45	
EVT-9512-918	1285		0.73	
EVT-9512-915	1649		0.51	
EVT-9512-929	1724		1.30	
EVT-9512-939	1814		1.50	
EVT-9512-928	1584		1.00	
EVT-9512-917	2099		2.20	
EVT-9512-933	1940		3.90	
514 Pilchuck	2328		2.10	
EVT-9512-914	2793		2.50	
EVT-9512-930	3113		2.10	
EVT-9302-202	2906		3.70	
EVT-9512-905	3223		5.30	
EVT-9512-908	3616		3.10	
520 E. Marine Drive	3666		13.00	
EVT-9512-924	4066		1.70	
EVT-9512-925	3849		4.10	

# ASARCO

Thomas L. Aldrich  
Site Manager  
Tacoma Plant

August 7, 1996

Mr. Dave Nazy  
Toxics Cleanup Program  
Department of Ecology  
3190 160th Avenue SE  
Bellevue, WA 98008-5452

Dear Dave:

This letter is in regard to a TCLP lead criterion for the former Smelter Site in Everett. As indicated in the *Revised TCLP Criterion Workplan* dated May 22, 1996, Hydrometrics was unable to increase the number of samples with total lead concentrations exceeding 1,798 ppm from samples previously archived.

Asarco and Ecology agreed to proceed with a TCLP arsenic criterion while the lead criterion would be further investigated. While samples were submitted for the TCLP arsenic criterion, Hydrometrics had four of the samples with the highest lead concentrations (993 to 1798 ppm) from XRF analysis analyzed for total and TCLP lead. Laboratory results indicate that the highest TCLP lead concentration was 0.64 ppm. The results can be found in the laboratory reports submitted for the TCLP arsenic criterion dated July 12, 1996. Other TCLP lead analyses include four samples from the 1995 Remedial Investigation (RI) report. Total lead concentrations ranged from 983 to 2,804 ppm and the highest TCLP result was 0.2 ppm.

Based on existing data for TCLP lead analyses, Hydrometrics attempted to collect samples with total lead concentrations exceeding 3,000 ppm to complete a TCLP lead criterion. XRF analyses performed on ten samples recently collected indicate that total lead concentrations ranged from 1,106 ppm to 3,190 ppm. Because these samples did not contain total lead concentrations significantly above 3,000 ppm, TCLP analyses were not performed.

The following lists maximum lead concentrations greater than 2,000 ppm for all sample locations within the fenced area. The maximum arsenic concentrations are listed as well for comparison.

<u>Sample Location</u>	<u>Lead (in ppm)</u>	<u>Arsenic (in ppm)</u>
S2	2,330	952
S3	8,870	4,700
S4	2,490	10,500
S5	2,150	6,890
S22	2,540	4,230
S111	11,000	727,000
S112	2,061	143,600

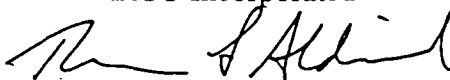
Asarco believes that no further work is warranted for a TCLP lead criterion due to the following:

- The difficulty in obtaining samples with lead concentrations greater than 3,000 ppm.
- Generally, soils in the smelter area contain higher concentrations of arsenic than lead.
- Existing data indicate total lead concentrations of less than 3,000 ppm do not exceed the TCLP lead standard of 5 ppm while the TCLP arsenic criterion has estimated that total arsenic concentrations at 3,000 ppm may exceed the TCLP arsenic standard of 5 ppm.

If you have any questions regarding the data contained in this letter, please call Steve Thompson of Hydrometrics at (206) 572-5481.

Very truly yours,

ASARCO Incorporated



Thomas L. Aldrich

cc: Polly McNeill, Heller, Ehrman, White, and McAuliffe - Seattle  
Mike Thorp, Heller, Ehrman, White, and McAuliffe - Tacoma  
Steve Thompson, Hydrometrics - Tacoma

## ASARCO TECHNICAL SERVICES CENTER

## ANALYTICAL DATA REPORT

Tacoma

Everett, WA Property - Technical Services (Project 5005)

Batch No: L961150

LAB NO	DATE COLLECTED	DESCRIPTION		PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L961150-1	30-DEC-95	EVT-9512-913	TCLP	AS	1.8	ppm	JJT	21-JUN-96	6010	
L961150-2	30-DEC-95	EVT-9512-920	TCLP	AS	.61	ppm	JJT	21-JUN-96	6010	
L961150-3	30-DEC-95	EVT-9512-927	TCLP	AS	.48	ppm	JJT	21-JUN-96	6010	
L961150-4	30-DEC-95	EVT-9512-932	TCLP	AS	.29	ppm	JJT	21-JUN-96	6010	
L961150-5	30-DEC-95	EVT-9512-903	TCLP	AS	1.1	ppm	JJT	21-JUN-96	6010	
L961150-6	30-DEC-95	EVT-9512-910	TCLP	AS	.45	ppm	JJT	21-JUN-96	6010	
L961150-7	30-DEC-95	EVT-9512-918	TCLP	AS	.73	ppm	JJT	21-JUN-96	6010	
				PB	.26		JJT	21-JUN-96	6010	
L961150-8	30-DEC-95	EVT-9512-915	TCLP	AS	.51	ppm	JJT	21-JUN-96	6010	
L961150-9	30-DEC-95	EVT-9512-929	TCLP	AS	1.3	ppm	JJT	21-JUN-96	6010	
L961150-10	30-DEC-95	EVT-9512-939	TCLP	AS	1.5	ppm	JJT	21-JUN-96	6010	
L961150-11	30-DEC-95	EVT-9512-928	TCLP	AS	1.0	ppm	JJT	21-JUN-96	6010	
				PB	.64		JJT	21-JUN-96	6010	
L961150-12	30-DEC-95	EVT-9512-917	TCLP	AS	2.2	ppm	JJT	21-JUN-96	6010	
				PB	.32		JJT	21-JUN-96	6010	
L961150-13	30-DEC-95	EVT-9512-933	TCLP	AS	3.9	ppm	JJT	21-JUN-96	6010	
L961150-14	30-DEC-95	514 PILCHUCK	TCLP	AS	2.1	ppm	JJT	21-JUN-96	6010	
L961150-15	30-DEC-95	EVT-9512-914	TCLP	AS	2.5	ppm	JJT	21-JUN-96	6010	
L961150-16	30-DEC-95	EVT-9512-930	TCLP	AS	2.1	ppm	JJT	21-JUN-96	6010	
L961150-17	30-DEC-95	EVT-9302-202	TCLP	AS	3.7	ppm	JJT	21-JUN-96	6010	
L961150-18	30-DEC-95	EVT-9512-905	TCLP	AS	5.3	ppm	JJT	21-JUN-96	6010	

Tacoma

Everett, WA Property - Technical Services (Project 5005)

Batch No: L961149

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS METHOD
L961149-19	30-DEC-95	EVT-9512-908	AS	3616	ppm	JJT	24-JUN-96	6010
L961149-20	30-DEC-95	520 E.MARINE DRIVE	AS	3666	ppm	JJT	24-JUN-96	6010
L961149-21	30-DEC-95	EVT-9512-924	AS	4066	ppm	JJT	24-JUN-96	6010
			PB	1431	ppm	JJT	24-JUN-96	6010
L961149-22	30-DEC-95	EVT-9512-925	AS	3849	ppm	JJT	24-JUN-96	6010

Approved

Reviewer

## ASARCO TECHNICAL SERVICES CENTER

## ANALYTICAL DATA REPORT

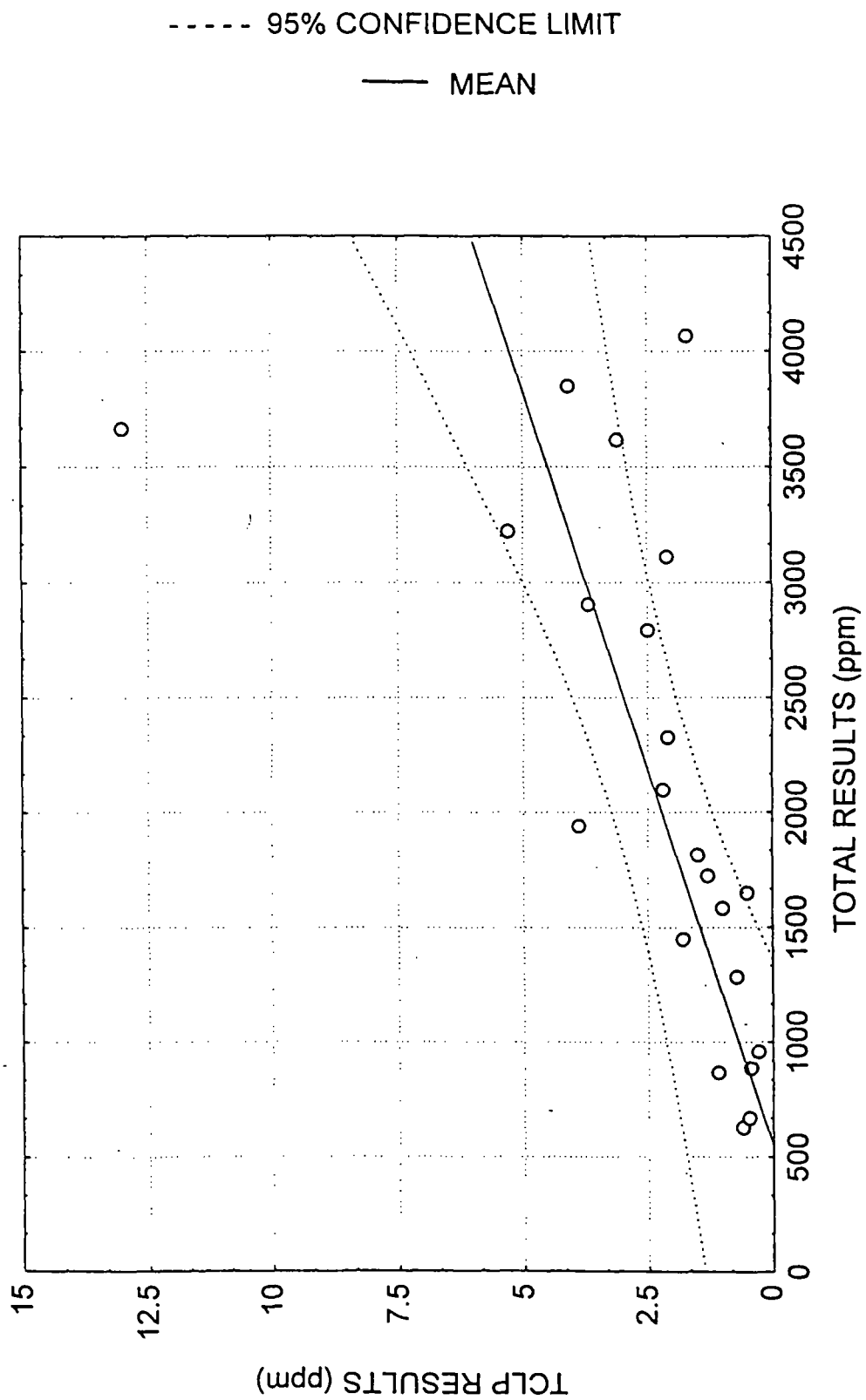
Tacoma

Everett, WA Property - Technical Services (Project 5005)

Batch No: L961149

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L961149-1	30-DEC-95	EVT-9512-913	AS	1469	ppm	JJT	24-JUN-96	6010	
L961149-2	30-DEC-95	EVT-9512-920	AS	626	ppm	JJT	24-JUN-96	6010	
L961149-3	30-DEC-95	EVT-9512-927	AS	668	ppm	JJT	24-JUN-96	6010	
L961149-4	30-DEC-95	EVT-9512-932	AS	957	ppm	JJT	24-JUN-96	6010	
L961149-5	30-DEC-95	EVT-9512-903	AS	865	ppm	JJT	24-JUN-96	6010	
L961149-6	30-DEC-95	EVT-9512-910	AS	884	ppm	JJT	24-JUN-96	6010	
L961149-7	30-DEC-95	EVT-9512-918	AS	1285	ppm	JJT	24-JUN-96	6010	
			PB	846	ppm	JJT	24-JUN-96	6010	
L961149-8	30-DEC-95	EVT-9512-915	AS	1649	ppm	JJT	24-JUN-96	6010	
L961149-9	30-DEC-95	EVT-9512-929	AS	1724	ppm	JJT	24-JUN-96	6010	
L961149-10	30-DEC-95	EVT-9512-939	AS	1814	ppm	JJT	24-JUN-96	6010	
L961149-11	30-DEC-95	EVT-9512-928	AS	1584	ppm	JJT	24-JUN-96	6010	
			PB	1217	ppm	JJT	24-JUN-96	6010	
L961149-12	30-DEC-95	EVT-9512-917	AS	2099	ppm	JJT	24-JUN-96	6010	
			PB	901	ppm	JJT	24-JUN-96	6010	
L961149-13	30-DEC-95	EVT-9512-933	AS	1940	ppm	JJT	24-JUN-96	6010	
L961149-14	30-DEC-95	514 PILCHUCK	AS	2328	ppm	JJT	24-JUN-96	6010	
L961149-15	30-DEC-95	EVT-9512-914	AS	2793	ppm	JJT	24-JUN-96	6010	
L961149-16	30-DEC-95	EVT-9512-930	AS	3113	ppm	JJT	24-JUN-96	6010	
L961149-17	30-DEC-95	EVT-9302-202	AS	2906	ppm	JJT	24-JUN-96	6010	
L961149-18	30-DEC-95	EVT-9512-905	AS	3223	ppm	JJT	24-JUN-96	6010	

TCLP CRITERION FOR ARSENIC



## ASARCO TECHNICAL SERVICES CENTER


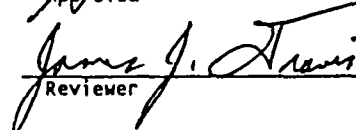
## ANALYTICAL DATA REPORT

Tacoma

Everett, WA Property - Technical Services (Project 5005)

Batch No: L961150

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L961150-19	30-DEC-95	EVT-9512-908	TCLP	AS	3.1	ppm	JJT	21-JUN-96	6010
L961150-20	30-DEC-95	520 E.MARINE DRIVE	TCLP	AS	13.	ppm	JJT	21-JUN-96	6010
L961150-21	30-DEC-95	EVT-9512-924	TCLP	AS	1.7	ppm	JJT	21-JUN-96	6010
			PB	.43		JJT	21-JUN-96	6010	
L961150-22	30-DEC-95	EVT-9512-925	TCLP	AS	4.1	ppm	JJT	21-JUN-96	6010

  
Approved  
  
Reviewer

## **APPENDIX G**

### **Summary Findings of Previous Investigations and the Recent Smelter Area Investigation**

Smelter Area Investigation Report

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	9.0	S-92	Silty fine sand	253	--
APA	surface	S-111	Topsoil, fill material, brown medium sand, silt organic material	205	--
APA	0.5	S-111	As above	4,100	--
APA	1.0	S-111	Multi-colored smelter debris (white, red, gray), brick chips, mortar	727,000	--
APA	2.0	S-111	White crystalline material, strong odor	430,000	--
APA	3.0	S-111	Brick material, medium sand, silt, brown, white specks	622,500	--
APA	4.0	S-111	As above	150,000	--
APA	7.0	S-111	Light grey silt, fine sand, small gravel, dense	19,140	--
APA	9.0	S-111	Light gray silt, very dense, small gravel	11,950	--
APA	11.0	S-111	As above	1,800	--
APA	surface	S-112	Brown to black organic material, sandy, some small gravel	1,510	--
APA	0.5	S-112	Silty, red (brick color), little clays, some oxidation	143,600	--
APA	1.0	S-112	Brown silty sand, some red, some oxidation	143,500	--
APA	2.0	S-112	Red silty (brick), some oxidation, little clays	83,600	--
APA	3.0	S-112	Sandy silt, red, some oxidation	34,950	--
APA	4.0	S-112	Brown sandy silt (brick chips) & had 1 foot void	20,550	--
APA	surface	S-113	Topsoil, organic material (brick chips), sandy	26,550	--
APA	0.5	S-113	Brown sandy silt, brick chips, small slag	38,650	--
APA	1.0	S-113	Brownish-red silts with brick chips	30,150	--
APA	2.0	S-113	Brownish-red silts, small gravels, small slag	25,540	--
APA	3.0	S-113	Black silty sand, small gravels	9,060	--
APA	4.0	S-113	Tan sandy silt, small gravels	2,620	--
APA	6.0	S-113	Brown silt with black (organic?) streaking	13,030	--
APA	7.0	S-113	Light gray silt with light brown marbling, moist	4,795	--
APA	9.0	S-113	Very dense, light grey silt, with gravels, slightly moist	864	--
APA	11.0	S-113	Dense, light gray, sandy silt with occasional gravel. Moist	389	--
APA	13.0	S-113	As above with sandy silt lens at 13',	346	--

Smelter Area Investigation Report

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA		SAIC-S46		3,170	--
APA	2.0	S-46	Topsoil, some gravel, brick	3,400	--
APA		SAIC-S46		3,120	--
APA	3.0	S-46	Topsoil, black clay, brick	3,300	--
APA		SAIC-S46		2,440	--
APA	4.0	S-46	Topsoil, black clay	900	--
APA	6.0	S-46	Tan sand, silt, gravel, some clay	900	--
APA	7.0	S-46	Moist, light gray, gravelly sandy silt	603	--
APA	9.0	S-46	As above	1,052	--
APA	11.0	S-46	Slightly moist, light gray silt with occasional fine gravel	512	--
APA	13.0	S-46	Dry, as above	134	--
APA	15.0	S-46	As above with coarse gravels	133	--
APA	surface	S-47	Top soil, sandy, organic material, brick pieces	2,580	--
APA		SAIC-S47	0.0-2.0"	3,880	--
APA	0.5	S-47	Topsoil, sandy, organic material	3,420	--
APA		SAIC-S47		4,080	--
APA	1.0	S-47	Gravel, sandy, little silt	4,980	--
APA		SAIC-S47		5,380	--
APA	2.0	S-47	Brown sand, gravelly, little silt, some brick	2,890	--
APA		SAIC-S47		5,130	--
APA	3.0	S-47	Brown sand, silty, black clay lenses, trace gravel	1,660	--
APA		SAIC-S47		2,150	--
APA	4.0	S-47	Tan sand, clayey, little gravel, oxidation staining	1,630	--
APA	6.0	S-47	Light gray sand, silty, clay lenses, some organic material	1,670	--
APA	7.0	S-47	Light grey silt, very dense, small gravel	466	--
APA	11.0	S-47	Light grey silt, gravel	642	--
APA	Surface	S-92	Black sandy silt, roots and grass	2,569	--
APA	0.5	S-92	Brown fine-medium sand with brick fragments	29,000	--
APA	1.0	S-92	Brown silt, fine sand	7,534	--
APA	2.0	S-92	Light brown silt	3,215	--
APA	3.0	S-92	As above	3,681	--
APA	4.0	S-92	Light brown sand	1,780	--
APA	6.0	S-92	Grey brown fine sand	753	--
APA	7.0	S-92	Grey fine sand	435	--

Smelter Area Investigation Report

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	1.0	S-13	Bricks	14,000	--
APA		SAIC-S13		9,150	--
APA	2.0	S-13	Smelter debris/bricks	4,500	--
APA		SAIC-S13		6,100	--
APA	3.0	S-13	Bricks	11,200	--
APA		SAIC-S13		2,620	--
APA	4.0	S-13	Smelter debris - till interface	6,500	--
APA	6.0	S-13	Slightly moist, gray silt with occasional gravel	1,100	--
APA	7.0	S-13	As above	214	--
APA	9.0	S-13	Dry as above	717	--
APA	11.0	S-13	Two inch sand lens at 11'. Dry, gray silt	313	--
APA	13.0	S-13	Dry gray silt, with occasional well rounded gravel	409	--
APA	15.0	S-13	Moist sandy gray silt, some silty sand, lenses	490	--
APA	surface	S-15	Organic material, sandy, crushed gravel	103	--
APA		SAIC-S15	0.0-2.0"	50	--
APA	0.5 - 0.75	S-15	Brown silty sand	230	--
APA	1.0	S-15	Brown silty sand, brick material	870	--
APA		SAIC-S15		577	--
APA	2.0	S-15	Brown silty clay, small gravels	1,670	--
APA		SAIC-S15		2,650	--
APA	3.0	S-15	Brown silty/very little clay, wet	1,780	--
APA		SAIC-S15		44,700	--
APA	4.0	S-15	Tan silty clay, hit top of flume? Hard, pipe? Sized off and had 1 foot void	650	--
APA	6.0	S-15	Tan, silty clay	3,040	--
APA	7.0	S-15	Moist, light gray silt with occasional gravel	1,074	--
APA	9.0	S-15	As above	293	--
APA	11.0	S-15	Sandy silt lens 10.7 to 11'. Light gray silt with occasional coarse gravel	526	--
APA	13.0	S-15	Dry, light gray silt with occasional coarse gravel	123	--
APA	15.0	S-15	As above	258	--
APA	surface	S-46	Topsoil, piece of brick	1,600	--
APA		SAIC-S46	0.0-2.0"	1,860	--
APA	0.5	S-46	Brown silt, sandy, gravelly	1,600	--
APA		SAIC-S46		2,590	--
APA	1.0	S-46	Topsoil, piece of brick	2,100	--

*Smelter Area Investigation Report*

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.5	EV-4-S		16	12
APA	1.5-3.0	EV-4-S		7	11
APA	4.4-6.0	EV-4-S		3	4
APA	9.0-10.5	EV-4-S		14	8
APA	15.0-17.0	EV-4-S		138	140
APA	24.0-25.5	EV-4-S		4	7
APA	55.5-57.5	EV-4-S		5	1
APA	0.0 - 0.5	EV-10	Road base fill	55	--
APA	2.0 - 2.8	EV-10	Silty sand. Half inch brick layer	1,660	--
APA	2.8 - 3.5	EV-10	Fine sand & silt. Moist	7,660	--
APA	5.0 - 5.5	EV-10	Sandy silt. Moist	773	--
APA	10.0 - 10.5	EV-10	Silty sand. Moist	1,728	--
APA	10.5 - 11.0	EV-10	As above	280	--
APA	0.0 - 0.5	EV-11	Road base fill	37	--
APA	2.0 - 3.5	EV-11	Sandy silt	77	--
APA	5.0 - 6.5	EV-11	Sandy silt. Moist	3,112	--
APA	10.0 - 11.5	EV-11	As above	748	--
APA	12.5 - 13.5	EV-11	As above. Slightly moist	364	--
APA	0.0 - 0.5	EV-12	Road base fill	49	--
APA	2.0 - 3.5	EV-12	Sandy silt. Moist	56	--
APA	5.0 - 6.5	EV-12	Sandy silt. Coarse sand lens at 6.25'. Moist	776	--
APA	10.5 - 11.5	EV-12	Silty sand. Moist	187	--
APA	12.5 - 13.5	EV-12	Silty sand. Slightly moist	60	--
APA	surface	S-8	Topsoil	10,800	--
APA		SAIC-S8	0.0-2.0"	917	--
APA	0.5	S-8	Brown silt, sandy, gravelly	6,700	--
APA	1.0	S-8	As above	5,300	--
APA	2.0	S-8	Grey silt, clayey, dark organic material	18,000	--
APA	3.0	S-8	Grey silt, clayey, oxidation spots. Hit water at 2.5'	1,500	--
APA	4.0	S-8	Gray silt, clayey, some gravel	1,400	--
APA	6.0	S-8	Gray silt, clayey, dense. Till first encountered at 5'8"	1,000	--
APA	7.0	S-8	As above	129	--
APA	surface	S-13	Top soil	1,400	--
APA		SAIC-S13	0.0-2.0"	1,350	--
APA	0.5	S-13	Smelter debris	1,600	--
APA		SAIC-S13		1,500	--

Smelter Area Investigation Report

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
			slightly moist		
APA	15.0	S-113	Dry, dense, light gray silt with occasional gravel	282	--
APA	0.0-1.0	SA-6	Silty loam	3,633	304
APA	1.0-2.0	SA-6	1.0-1.5' Silty loam 1.5-2.0' Brick	39,777	1327
APA	2.0-3.0	SA-6	Smelter debris	40,938	41
APA	3.0-4.0	SA-6	Smelter debris	33,201	20
APA	4.0-5.0	SA-6	Silty sand	7,903	215
APA	5.0-6.0	SA-6	Silty sand	1,260	10
APA	6.0-7.0	SA-6	Silty sand	--	--
APA	7.5-9.0	SA-6	Silty sand	2,761	10
APA	0.0-1.0	SA-7	Silty loam	19,122	486
APA	1.0-2.0	SA-7	Smelter debris; trace brick fragments	38,751	563
APA	2.0-3.0	SA-7	Sandy silt	14,277	10
APA	3.0-4.0	SA-7	Sandy silt	7,476	10
APA	4.0-5.0	SA-7	Sandy silt	5,245	10
APA	5.0-6.0	SA-7	Sandy silt	1,348	10
APA	7.5-9.0	SA-7	Gravelly silty sand	402	10
APA	10.0-11.0	SA-7	Gravelly silty sand	258	10
APA	0.0-1.0	SA-8	Silty gravelly sand	1,208	199
APA	1.0-2.0	SA-8	Silty gravelly sand	111	12
APA	2.0-3.0	SA-8	Gravelly silty sand	79	10
APA	3.0-4.0	SA-8	Gravelly silty sand	42	10
APA	4.0-5.0	SA-8	Sandy silt	52	10
APA	0.0-1.0	SA-9	Silty sand	798	473
APA	1.0-2.0	SA-9	Silty sand	813	625
APA	2.0-3.0	SA-9	Silty sand	1,078	436
APA	3.0-4.0	SA-9	Silty sand	1,189	221
APA	4.0-5.0	SA-9	Silty sand	51	11
APA	0.0-1.0	SA-10	Silty loam	312	113
APA	1.0-2.0	SA-10	Silty sand	10	10
APA	2.0-3.0	SA-10	Silty sand	70	10
APA	3.0-4.0	SA-10	Silty sand	10	10
APA	4.0-5.0	SA-10	Silty sand	14	10
APA	0.0-1.0	SA-11	Sandy loam	258	101
APA	1.0-2.0	SA-11	Silty sand	231	10
APA	2.0-3.0	SA-11	Silty sand	10	11
APA	3.0-4.0	SA-11	Silty sand	10	10
APA	4.0-5.0	SA-11	Sandy silt	10	12

Smelter Area Investigation Report

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	0.0-1.0	SA-12	Silty sand	968	604
APA	1.0-2.0	SA-12	Gravelly sand and silt	125	52
APA	2.0-3.0	SA-12	Gravelly sand and silt	14	11
APA	3.0-4.0	SA-12	Gravelly sand and silt	10	10
APA	4.0-5.0	SA-12	Gravelly sand and silt	10	13
APA	0.0-1.0	SA-25	0.0-0.5' Asphalt 0.5-1.0' Gravelly sand	249	36
APA	1.0-2.0	SA-25	Gravelly sand	429	43
APA	2.0-3.0	SA-25	Silty sand	122	10
APA	3.0-4.0	SA-25	Silty sand	10	10
APA	4.0-5.0	SA-25	Silty sand	140	12
APA	0.0-1.0	SA-26		228	72
APA	1.0-2.0	SA-26		1,105	257
APA	2.0-3.0	SA-26		390	10
APA	3.0-4.0	SA-26		54	10
APA	4.0-5.0	SA-26		101	10
APA	surface	SAIC-S9		1,030	--
APA	0.5	SAIC-S9		7,210	--
APA	1.0	SAIC-S9		6,170	--
APA	2.0	SAIC-S9		3,300	--
APA	3.0	SAIC-S9		1,080	--
APA	surface	SAIC-S10		194	--
APA	0.5	SAIC-S10		32	--
APA	1.0	SAIC-S10		34	--
APA	2.0	SAIC-S10		147	--
APA	3.0	SAIC-S10		25	--
APA	surface	SAIC-S11		114	--
APA	0.5	SAIC-S11		130	--
APA	1.0	SAIC-S11		355	--
APA	2.0	SAIC-S11		192	--
APA	3.0	SAIC-S11		336	--
APA	surface	SAIC-S12		38	--
APA	0.5	SAIC-S12		412	--
APA	1.0	SAIC-S12		266	--
APA	2.0	SAIC-S12		255	--
APA	3.0	SAIC-S12		758	--
APA	surface	SAIC-S14		833	--
APA	0.5	SAIC-S14		2,190	--
APA	1.0	SAIC-S14		3,330	--

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	2.0	SAIC-S14		6,490	--
APA	3.0	SAIC-S14		2,410	--
APA	0.5	SAIC-S15		313	--
APA	surface	SAIC-S16		235	220
APA	surface	SAIC-S17		235	--
APA	0.5	SAIC-S17		241	--
APA	1.0	SAIC-S17		366	--
APA	2.0	SAIC-S17		976	--
APA	3.0	SAIC-S17		1,190	--
APA	surface	SAIC-S18		131	190
APA	surface	SAIC-S43		239	--
APA	0.5	SAIC-S43		231	--
APA	1.0	SAIC-S43		528	--
APA	2.0	SAIC-S43		104	--
APA	3.0	SAIC-S43		13	--
APA	surface	SAIC-S44		341	209
APA	surface	SAIC-S45		7,450	--
APA	1.0	SAIC-S45		13,700	--
APA	2.0	SAIC-S45		4,730	--
APA	3.0	SAIC-S45		1,940	--
APA	surface	SAIC-S49		2,010	233
APA	surface	SS-5		541	480
APA	surface	SS-6		131	34
APA	surface	SS-9		182	87
APA	0.0-1.0	TP-4	Sandy loam	565	152
APA	1.0-2.0	TP-4	Smelter debris; occasional brick debris	1,981	144
APA	2.0-3.0	TP-4	Smelter debris; abundant brick debris	8,799	533
APA	3.0-4.0	TP-4	3.0-3.5' Smelter debris; abundant brick debris 3.5-4.0' Sand	32,918	468
APA	5.0-6.0	TP-4	Sand and silt	1,600	16
APA	6.0-7.0	TP-4	Sandy silt	225	10
APA	8.0-9.0	TP-4	Sandy silt	219	10
APA	10.0-11.0	TP-4	Sandy silt	206	10
APA	4-0-5.0	TP-4	4.0-4.5' Sand 4.5-5.0' Sand and silt	4,724	30
APA	0.0-1.0	TP-5	Sandy loam	1,161	473
APA	1.0-2.0	TP-5	Smelter debris; abundant red brick fragments	5,370	92
APA	2.0-3.0	TP-5	Gravelly silt and sand	2,777	34

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	3.0-4.0	TP-5	Silt and sand	827	13
APA	4.0-5.0	TP-5	Silt and sand	502	10
APA	0.0-1.0	TP-6A	Smelter debris; rounded brick fragments	4,373	289
APA	1.0-2.0	TP-6A	Smelter debris; mortared brick layer	12,487	458
APA	2.0-3.0	TP-6A	Silty sand	9,726	38
APA	3.0-4.0	TP-6A	Silty sand	9,252	29
APA	5.0-6.0	TP-6A	Silt and sand	3,235	10
APA	6.0-7.0	TP-6A	Sandy silt	353	10
APA	8.0-9.0	TP-6A	Sandy silt	706	10
APA	10.0-11.0	TP-6A	Sandy silt	412	10
APA	12.0-13.0	TP-6A	Silt	249	10
APA	4.0-5.0	TP-6A	Silt and sand	4,305	10
APA	0.0-1.0	TP-6B	Silty loam	9,388	544
APA	1.0-2.0	TP-6B	Smelter debris; intact brick floor	14,223	505
APA	2.0-3.0	TP-6B	Silty sand	13,985	10
APA	3.0-4.0	TP-6B	Silty sand	13,537	14
APA	5.0-6.0	TP-6B	Silt and sand	2,740	10
APA	4.0-5.0	TP-6B	Silt and sand	5,497	10
APA	0.0-1.0	TP-7	Sandy loam	2,220	523
APA	1.0-2.0	TP-7	Smelter debris; red brick fragments	8,771	594
APA	2.0-3.0	TP-7	Smelter debris; red brick fragments	9,935	415
APA	3.0-4.0	TP-7	Silty sand and gravel	10,644	47
APA	5.0-6.0	TP-7	Silty sand	2,952	12
APA	6.0-7.0	TP-7	Silty sand	684	10
APA	8.0-9.0	TP-7	Silty sand	698	10
APA	10.0-11.0	TP-7	Silty sand	541	10
APA	4.0-5.0	TP-7	Silty sand and gravel	6,586	10
APA	0.0-1.0	TP-8	Smelter debris; red brick fragments	3,738	625
APA	1.0-2.0	TP-8	Smelter debris; red brick fragments	2,797	415
APA	2.0-3.0	TP-8	Smelter debris; abundant brick fragments	4,619	309
APA	3.0-4.0	TP-8	Smelter debris; abundant brick fragments	7,237	200
APA	4.0-5.0	TP-8	Sandy silt	4,669	17
APA	5.0-6.0	TP-8	Gravelly sand	564	11
APA	0.0-1.0	TP-9	Smelter debris; red brick fragments	33,665	947
APA	1.0-2.0	TP-9	Smelter debris; black wood fragments	10,503	795
APA	2.0-3.0	TP-9	Smelter debris; black wood fragments	5,668	672
APA	3.0-4.0	TP-9	Silty sand and gravel	7,821	16
APA	5.0-6.0	TP-9	Silty and sand	535	14

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
APA	4-0-5.0	TP-9	Silty sand and gravel	1,564	14
BFA	surface	B-1	Topsoil, root material	24	--
BFA	0.0-1.0	B-1		24	40
BFA	2.0	B-1	Topsoil, organic, rich, root material, silty clay	10	--
BFA	2.0-3.0	B-1		10	16
BFA	4.0	B-1	Sandy silt, some pebbles, grayish-brown	2	--
BFA	4.0-5.0	B-1		7	4
BFA	6.0	B-1	Sandy silt, pebbles, gray-brown	3	--
BFA	6.0-7.0	B-1		3	4
BFA	8.0-9.0	B-1		2	5
BFA	9.0	B-1	Glacial till, silt, rounded pebbles, sandy. Tan weathered granites (could still be fill material)	2	--
BFA	10.0-11.0	B-1		6	7
BFA	11.0	B-1	Gravelly silt, moist	6	--
BFA	12.0-13.0	B-1		6	7
BFA	13.0	B-1	Gravelly silt, pebbles, tan, little sand	6	--
BFA	14.0-15.0	B-1		3	5
BFA	15.0	B-1	Gravelly silt, oxidation stains near base	4	--
BFA	20.0-21.0	B-1		4	4
BFA	0.0-2.0	B-3	Silt - light brown: with very fine sand, root mass: dry	49	--
BFA	2.0 - 3.5	B-3	Sandy silt - light brown; red brick fragments, oxidation and mottled throughout, green precipitate	1,059	--
BFA	5.0 - 6.5	B-3	Sandy silt - light brown, very fine grained sand	117	--
BFA	10 - 10.5	B-3	Sandy silt - light brown; sandy clay lens. Moist	31	--
BFA	15 - 15.25	B-3	Sandy gravel - grey. Wet	7	--
BFA	0.0-0.2	B-4		9	76
BFA	2.0-6.5	B-4		20	60
BFA	7.5-9.0	B-4		7	19
BFA	10.0-10.5	B-4		3	2.8
BFA	15.0-15.5	B-4		2	2.2
BFA	0.0-2.0	B-5	Silty sand - light brown, abundant root mass. Dry	18	--
BFA	2.0 - 3.0	B-5	Sandy silt. Dry	3	--
BFA	5.0 - 5.5	B-5	As above	4	--

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	10.0 - 10.75	B-5	As above	5	--
BFA	15 - 16	B-5	Sand. Moist	3	--
BFA	surface	B-6	Silty sand - light brown, abundant root mass. Dry	25	--
BFA	2.0 - 3.5	B-6	Silt - light brown. Moist	3	--
BFA	5.0 - 5.5	B-6	As above	4	--
BFA	10.0 - 11.0	B-6	Silt with gravel and sand	2	--
BFA	15 - 15.5	B-6	Silty sand. Moist	4	--
BFA	1.0-2.5	EV-3-S		288	66
BFA	4.0-5.5	EV-3-S		248	44
BFA	8.5-10.0	EV-3-S		212	
BFA	10.0-11.5	EV-3-S		34	4
BFA	14.5-16.8	EV-3-S		83	7
BFA	24.0-25.5	EV-3-S		66	
BFA	34.0-35.5	EV-3-S		14	6
BFA	44.0-45.5	EV-3-S		5	3
BFA	49.0-50.5	EV-3-S		3	6
BFA	0.0 - 0.5	EV-13	Road base fill	487	--
BFA	2.0 - 3.5	EV-13	Silty sand. Moist	11,810	--
BFA	5.0 - 5.5	EV-13	As above	2,785	--
BFA	5.5 - 6.5	EV-13	As above	1,831	--
BFA	10.0 - 11.5	EV-13	Silty sand. Slightly moist	2,259	--
BFA	0.0 - 0.5	EV-14	Road base	53	--
BFA	2.0 - 3.5	EV-14	Sandy silt. Slightly moist	24	--
BFA	5.0 - 6.5	EV-14	As above	4	--
BFA	10.0 - 11.5	EV-14	As above	20	--
BFA	0.0-1.0	SA-5	Silty loam	4,677	942
BFA	1.0-2.0	SA-5	Intact brick structure	808	115
BFA	2.0-3.0	SA-5	As above	47	14
BFA	3.0-4.0	SA-5	As above	60	14
BFA	4.0-5.0	SA-5	As above	11	15
BFA	5.0-6.0	SA-5	As above	35	17
BFA	8.0-9.0	SA-5	Silty sand	317	10
BFA	11.0-12.0	SA-5	Silty sand	280	10
BFA	14.0-15.0	SA-5	Silty sand	61	13
BFA	0.0-1.0	SA-23	0.0-0.7' Silty loam 0.7-1.0' Silty sand	25	211
BFA	1.0-2.0	SA-23	Silty sand	12	28
BFA	2.0-3.0	SA-23	Silty sand	10	19
BFA	3.0-4.0	SA-23	Silty sand	12	82

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	4-0-5.0	SA-23	Silty sand	10	36
BFA	0.0-1.0	SA-24	Asphalt and gravel	18	20
BFA	1.0-2.0	SA-24	Gravelly sand	10	10
BFA	2.0-3.0	SA-24	Sandy silt	36	63
BFA	3.0-4.0	SA-24	Sandy silt	10	10
BFA	4.0-5.0	SA-24	Sandy silt	10	17
BFA	surface	SAI-SS-1	Surface Sample	18	35
BFA	surface	SAI-SS-2	Surface Sample	82	364
BFA	surface	SAI-SS-3	Surface Sample	15	14
BFA	surface	SAI-SS-4	Surface Sample	64	65
BFA	surface	SAI-SS-5	Surface Sample	65	329
BFA	surface	SAIC-S48		791	--
BFA	0.5	SAIC-S48		584	--
BFA	1.0	SAIC-S48		780	--
BFA	2.0	SAIC-S48		49	--
BFA	3.0	SAIC-S48		97	--
BFA	surface	SAIC-S60		23	666
BFA	surface	SAIC-S61		80	4540
BFA	0.0-2.0	SAIC-S69		67	--
BFA	0.5	SAIC-S69		121	--
BFA	1.0	SAIC-S69		41	--
BFA	2.0	SAIC-S69		4	--
BFA	3.0	SAIC-S69		4	--
BFA	surface	SAIC-S70		51	217
BFA	surface	SAIC-S71		333	630
BFA	surface	SAIC-S81		54	67
BFA	surface	SAIC-S82		55	89
BFA	surface	SS-8		345	209
BFA		T6-1	A Horizon	24	311
BFA		T6-2	B Horizon	42	834
BFA		T6-3	C Horizon	5	189
BFA		T7-2	B Horizon	1,050	130
BFA		T7-2	A Horizon	931	461
BFA		T7-3	C Horizon	468	121
BFA	0.0-0.5	TB-1	Asphalt	18	20
BFA	2.0-3.5	TB-1	Silt	46	27
BFA	5.0-6.5	TB-1	Silt	48	417
BFA	10.0-11.5	TB-1	Gravelly sandy silt	695	63
BFA	15.0-16.5	TB-1	Silty gravelly sand	455	13

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
BFA	20.0-21.5	TB-1	Sand and gravel	197	12
BFA	25.0-26.5	TB-1	Sand	201	10
BFA	30.0-31.5	TB-1	Silt	120	10
BFA	35.0-36.5	TB-1	Sand	76	10
FSA	surface	EV-2-S	Brown fine coarse sand, some silt, some brick	660	--
FSA	1.0	EV-2-S	As above	117	--
FSA	2.0	EV-2-S	As above, with fragments of brick & slag	1,090	--
FSA	3.0	EV-2-S	6" as above with increased white & green oxidation	1,687	--
FSA	11.0	EV-2-S	Light brown/grey silt	7	--
FSA	surface	S-27	Topsoil, organic material, sandy	390	--
FSA		SAIC-S27	0.0-2.0"	2,600	--
FSA	0.5	S-27	Brown silty sand, brick chips, small gravel	3,510	--
FSA		SAIC-S27		2,090	--
FSA	1.0	S-27	Tan sandy silt, small gravel	4,620	--
FSA		SAIC-S27		3,010	--
FSA	2.0	S-27	Brown silty sand, brick chips, black stains	5,306	--
FSA		SAIC-S27		930	--
FSA	3.0	S-27	Tan, silty sand, oxidized, small gravels	660	--
FSA		SAIC-S27		1,880	--
FSA	4.0	S-27	Tan, silty sand, oxidized	2,530	--
FSA	6.0	S-27	Tan silty sand	2,480	--
FSA	7.0	S-27	Light grey silt, soft, moist, small gravel	1,773	--
FSA	9.0	S-27	Light grey silt, very dense, small gravel (till started at 8.0')	1,355	--
FSA	surface	S-28	Topsoil, organic matter, sandy, red brick chips	3,010	--
FSA		SAIC-S28	0.0-2.0"	1,190	--
FSA	0.5	S-28	Brown silty sand, red brick, small gravels	5,620	--
FSA		SAIC-S28		1,800	--
FSA	1.0	S-28	Brown red, white silty sand with brick chips, smelter debris	14,740	--
FSA		SAIC-S28		4,810	--
FSA	2.0	S-28	Brown silty sand, red brick smelter debris	16,840	--
FSA		SAIC-S28		6,230	--

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	3.0	S-28	Tan, silty sand, small gravels	7,030	--
FSA		SAIC-S28		6,020	--
FSA	4.0	S-28	As above. Wet	7,480	--
FSA	6.0	S-28	Tan silty sand, wet. Till started at 4.8'	6,240	--
FSA	6.0	S-34	Slightly moist light brown silt with occasional gravels	118	--
FSA	4.0	S-36	Moist, light brown silt with small gravel and 5% brick fragments	3,260	--
FSA	6.0	S-36	Moist light brown silt with gravel and brick fragments. Moist light gray silt at 6.5' with small gravel and no brick	775	--
FSA	4.0	S-37	Moist, light gray silt, dense with gravel	18	--
FSA	6.0	S-37	As above	5	--
FSA	surface	S-72	Topsoil, organic - rich	295	--
FSA		SAIC-S72	0.0-2.0"	891	--
FSA	0.5	S-72	As above	380	--
FSA		SAIC-S72		1,140	--
FSA	1.0	S-72	Brown sand, silty, organic - rich	1,300	--
FSA		SAIC-S72		5,360	--
FSA	2.0	S-72	Brown sand, silty, plus grey material	8,000	--
FSA	3.0	S-72	Light brown sand, silty, brick fragments, grey material	21,200	--
		SAIC-S72		53,100	--
FSA	4.0	S-72	Light brown sand, clayey, oxidation rust spots	5,400	--
FSA	6.0	S-72	Grey. silt, sandy, clayey, pebbles	1,700	--
FSA	7.0	S-72	Light grey silt, very dense, small gravel	489	--
FSA	9.0	S-72	Light grey silt, very dense, dry, small gravel	263	--
FSA	0.0-1.0	SA-13	Sandy silt	846	281
FSA	1.0-2.0	SA-13	Sandy silt	1,024	212
FSA	2.0-3.0	SA-13	Sandy silt	13	12
FSA	3.0-4.0	SA-13	Sandy silt	227	10
FSA	4-0-5.0	SA-13	Sandy silt	42	10
FSA	0.0-1.0	SA-14	Sandy silt	11	10
FSA	1.0-2.0	SA-14	Silty sand	10	10
FSA	2.0-3.0	SA-14	Silty sand	10	13
FSA	3.0-4.0	SA-14	Silty sand	10	10
FSA	4-0-5.0	SA-14	Silty sand	10	10
FSA	0.0-1.0	SA-15	Silty sand	113	35
FSA	1.0-2.0	SA-15	Silty sand	10	11

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	2.0-3.0	SA-15	Silty sand	10	10
FSA	3.0-4.0	SA-15	Silty sand	10	10
FSA	4.0-5.0	SA-15	Silty sand	10	10
FSA	0.0-1.0	SA-16	Smelter debris	405	22
FSA	1.0-2.0	SA-16	Smelter debris	51	10
FSA	2.0-3.0	SA-16	Smelter debris	166	23
FSA	3.0-4.0	SA-16	Silty sand	10	10
FSA	4.0-5.0	SA-16	Silty sand	10	10
FSA	0.0-1.0	SA-17	Trace brick fragments	811	239
FSA	1.0-2.0	SA-17	Trace brick fragments	610	103
FSA	2.0-3.0	SA-17	Silty sand	10	10
FSA	3.0-4.0	SA-17	Silty sand	10	10
FSA	4.0-5.0	SA-17	Silty sand	10	10
FSA	0.0-1.0	SA-18	Silty loam	1,798	713
FSA	1.0-2.0	SA-18	Silty sand	288	10
FSA	2.0-3.0	SA-18	Silty sand	18	10
FSA	3.0-4.0	SA-18	Sandy silt	10	10
FSA	4.0-5.0	SA-18	Sandy silt	13	10
FSA	surface	SAIC-S25		311	--
FSA	0.5	SAIC-S25		146	--
FSA	1.0	SAIC-S25		272	--
FSA	2.0	SAIC-S25		80	--
FSA	3.0	SAIC-S25		5	--
FSA	surface	SAIC-S26		421	--
FSA	0.5	SAIC-S26		800	--
FSA	1.0	SAIC-S26		642	--
FSA	2.0	SAIC-S26		80	--
FSA	3.0	SAIC-S26		62	--
FSA	surface	SAIC-S29		484	--
FSA	0.5	SAIC-S29		935	--
FSA	1.0	SAIC-S29		737	--
FSA	2.0	SAIC-S29		488	--
FSA	3.0	SAIC-S29		188	--
FSA	surface	SAIC-S30		432	--
FSA	0.5	SAIC-S30		203	--
FSA	1.0	SAIC-S30		319	--
FSA	2.0	SAIC-S30		338	--
FSA	3.0	SAIC-S30		43	--
FSA	surface	SAIC-S33		240	96

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	surface	SAIC-S34	0.0-2.0" Pre-RI sample (no description)	276	
FSA	0.5	SAIC-S34	As above	312	--
FSA	1.0	SAIC-S34	As above	415	--
FSA	2.0	SAIC-S34	As above	1,550	--
FSA	3.0	SAIC-S34	As above	1,160	--
FSA	surface	SAIC-S35		298	--
FSA	0.5	SAIC-S35		435	--
FSA	1.0	SAIC-S35		239	--
FSA	2.0	SAIC-S35		727	--
FSA	3.0	SAIC-S35		849	--
FSA	surface	SAIC-S36	0.0 - 2.0" No log in RI	764	--
FSA	0.5	SAIC-S36		1,100	--
FSA	1.0	SAIC-S36		994	--
FSA	2.0	SAIC-S36		1,420	--
FSA	3.0	SAIC-S36		849	--
FSA	surface	SAIC-S37	0.0-2.0" Pre-RI sample: no sample description	857	--
FSA	0.5	SAIC-S37		1,900	--
FSA	1.0	SAIC-S37		1,550	--
FSA	2.0	SAIC-S37		328	--
FSA	3.0	SAIC-S37		99	--
FSA	surface	SS-10		381	257
FSA	surface	SS-11		4,670	425
FSA	surface	SS-12		864	864
FSA	0.0-1.0	TP-10-A	Silty loam	473	112
FSA	1.0-2.0	TP-10-A	Smelter debris; red brick fragments	2,460	331
FSA	2.0-3.0	TP-10-A	Smelter debris; red brick fragments	3,571	445
FSA	3.0-4.0	TP-10-A	Smelter debris; red brick fragments	2,399	224
FSA	4.0-5.0	TP-10-A	Smelter debris; red brick fragments (flue floor)	12,491	1309
FSA	5.0-6.0	TP-10-A	Sandy silt	2,209	20
FSA	0.0-1.0	TP-10B	Smelter debris; red brick fragments	866	420
FSA	1.0-2.0	TP-10B	Smelter debris; red brick fragments	1,356	268
FSA	2.0-3.0	TP-10B	Smelter debris; red brick fragments	3,151	284
FSA	3.0-4.0	TP-10B	Smelter debris; red brick fragments	3,277	298
FSA	4.0-5.0	TP-10B	Smelter debris; red brick fragments	15,433	599
FSA	5.0-6.0	TP-10B	Smelter debris; trace red brick frags	6,748	24
FSA	6.0-7.0	TP-10B	Silty sand	453	10
FSA	8.0-9.0	TP-10B	Silty sand	401	10
FSA	10.0-11.0	TP-10B	Silty sand	490	10

Smelter Area Investigation Report

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
FSA	0.0-1.0	TP-11A	Silty loam	3,148	101
FSA	1.0-2.0	TP-11A	Smelter debris; trace red brick fragments	4,692	209
FSA	2.0-3.0	TP-11A	Smelter debris; trace red brick fragments	12,893	558
FSA	3.0-4.0	TP-11A	Smelter debris; brick	53,824	186
FSA	4.0-5.0	TP-11A	Sand and silt	23,094	22
FSA	0.0-1.0	TP-11B	Silty loam	1,722	87
FSA	1.0-2.0	TP-11B	Smelter debris; trace red brick	6,869	267
FSA	2.0-3.0	TP-11B	Smelter debris; trace red brick	19,691	742
FSA	3.0-4.0	TP-11B	Smelter debris; sand and brick	19,937	86
FSA	5.0-6.0	TP-11B	Sand and silt	11,897	10
FSA	6.0-7.0	TP-11B	Sand	8,408	11
FSA	8.0-9.0	TP-11B	Sandy silt	1,450	10
FSA	10.0-11.0	TP-11B	Sandy silt	504	10
FSA	12.0-13.5	TP-11B	Sandy silt	212	10
FSA	4.0-5.0	TP-11B	Sand and silt	36,165	30
NSA	surface	S-74	Dark brown fine sand/silt, root materials, small gravels	183	--
NSA		SAIC-S74	0.0-2.0"	788	--
NSA	0.5	S-74	As above	231	--
NSA	1.0	S-74	Red brown fine sand/silt, small gravels	230	--
NSA	2.0	S-74	As above	13	--
NSA	3.0	S-74	As above. Moist	3	--
NSA	4.0	S-74	Grey fine sand/silt, small gravels, dry	3	--
NSA	surface	S-114	Black/brown topsoil/organic material, sandy, small gravels	375	--
NSA	0.5	S-114	As above	290	--
NSA	1.0	S-114	Brown sandy silt, some oxidation	55	--
NSA	2.0	S-114	Brown silty sand, small gravels	55	--
NSA	3.0	S-114	Tan, sandy clay, some oxidation, some water, small gravels	5	--
NSA	4.0	S-114	Grey silty/clay, small gravels	7	--
NSA	surface	S-115	Topsoil, sandy, some organic material, plastic liner	675	--
NSA	0.5	S-115	Brown topsoil, sandy, some organic matter	725	--
NSA	1.0	S-115	Brown topsoil, sandy, silty, some black clay stringers, some pebbles	350	--
NSA	2.0	S-115	Tan, sandy clay & silt	8	--
NSA	3.0	S-115	Tan, sandy clay, some oxidation stains	6	--
NSA	4.0	S-115	Grey silty clay, some sand	8	--

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
NSA	surface	S-116	Brown topsoil, organic material, sandy	350	--
NSA	0.5	S-116	Brown, tan sandy/silt, small gravels	185	--
NSA	1.0	S-116	Brown silty sand	76	--
NSA	2.0	S-116	As above	69	--
NSA	3.0	S-116	Brown silty clay	98	--
NSA	4.0	S-116	Brown, silty, sand, wet	400	--
NSA	0.0-1.0	SA-19	Silty loam	44	84
NSA	1.0-2.0	SA-19	Silty loam	10	11
NSA	2.0-3.0	SA-19	Silty sand	10	12
NSA	3.0-4.0	SA-19	Silty sand	10	10
NSA	4.0-5.0	SA-19	Silty sand	10	10
NSA	0.0-1.0	SA-20	Silty loam	589	1123
NSA	1.0-2.0	SA-20	Silty loam	837	1390
NSA	2.0-3.0	SA-20	Sandy silt	10	13
NSA	3.0-4.0	SA-20	Sandy silt	10	14
NSA	4.0-5.0	SA-20	Sandy silt	10	10
NSA	0.0-1.0	SA-21	Silty loam	275	323
NSA	1.0-2.0	SA-21	Silty loam	331	387
NSA	2.0-3.0	SA-21	Sandy silt with trace brick fragments	290	344
NSA	3.0-4.0	SA-21	Sandy silt with trace brick fragments	104	140
NSA	4.0-5.0	SA-21	Silty sand	10	10
NSA	0.0-1.0	SA-22	0.0-0.5' Asphalt 0.5-1.0' Sand and gravel	37	10
NSA	1.0-2.0	SA-22	Sand and gravel	20	10
NSA	2.0-3.0	SA-22	Sandy silt	20	11
NSA	3.0-4.0	SA-22	Sandy silt	30	50
NSA	4.0-5.0	SA-22	Gravelly silt	10	10
NSA	surface	SAIC-S62		90	150
NSA	surface	SAIC-S73		71	--
NSA	0.5	SAIC-S73		81	--
NSA	1.0	SAIC-S73		85	--
NSA	2.0	SAIC-S73		28	--
NSA	3.0	SAIC-S73		27	--
NSA	4.0	SAIC-S73		3	--
NSA	surface	SAIC-S75		8,080	386
NSA	surface	SAIC-S76		556	419
NSA	surface	SAIC-S79		34	72
NSA	surface	SAIC-S80		40	152
NSA	surface	SS-13		476	688

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-1		91	1221
R-529	0.5-1.0	HA-1		159	3582
R-529	2.0-2.5	HA-1		10	11
R-529	4.0-4.5	HA-1		10	10
R-529	0.0-0.5	HA-2		11	1003
R-529	0.5-1.0	HA-2		11	539
R-529	2.0-2.5	HA-2		21	331
R-529	4.0-4.5	HA-2		52	219
R-529	0.0-0.5	HA-3		16	686
R-529	0.5-1.0	HA-3		16	1049
R-529	2.0-2.5	HA-3		296	323
R-529	4.0-4.5	HA-3		389	758
R-529	0.0-0.5	HA-4		30	925
R-529	0.5-1.0	HA-4		20	338
R-529	2.0-2.5	HA-4		10	59
R-529	4.0-4.5	HA-4		10	10
R-529	0.0-0.5	HA-5		10	14
R-529	0.5-1.0	HA-5		10	10
R-529	2.0-2.5	HA-5		10	10
R-529	4.0-4.5	HA-5		10	10
R-529	0.0-0.5	HA-6		11	738
R-529	0.5-1.0	HA-6		10	160
R-529	2.0-2.5	HA-6		10	13
R-529	4.0-4.5	HA-6		10	166
R-529	0.0-0.5	HA-7		15	295
R-529	0.5-1.0	HA-7		15	276
R-529	2.0-2.5	HA-7		21	351
R-529	0.0-0.5	HA-8		20	755
R-529	0.5-1.0	HA-8		18	20
R-529	2.0-2.5	HA-8		10	190
R-529	4.0-4.5	HA-8		10	10
R-529	0.0-0.5	HA-9		10	21
R-529	0.5-1.0	HA-9		10	21
R-529	2.0-2.5	HA-9		10	23
R-529	4.0-4.5	HA-9		10	10
R-529	0.0-0.5	HA-10		22	793
R-529	0.5-1.0	HA-10		10	174
R-529	2.0-2.5	HA-10		10	80
R-529	4.0-4.5	HA-10		349	1039

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Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
R-529	0.0-0.5	HA-11		10	852
R-529	0.5-1.0	HA-11		25	688
R-529	2.0-2.5	HA-11		10	27
R-529	4.0-4.5	HA-11		20	183
R-529	0.0-0.5	HA-12		21	1086
R-529	0.5-1.0	HA-12		10	181
R-529	2.0-2.5	HA-12		215	7186
R-529	4.0-4.5	HA-12		10	13
R-529	0.0-0.5	HA-13		10	25
R-529	0.5-1.0	HA-13		10	26
R-529	2.0-2.5	HA-13		10	10
R-529	4.0-4.5	HA-13		10	12
R-529	0.0-0.5	HA-14		12	633
R-529	0.5-1.0	HA-14		20	62
R-529	2.0-2.5	HA-14		10	10
R-529	4.0-4.5	HA-14		45	40
R-529	0.0-0.5	HA-15		17	780
R-529	0.5-1.0	HA-15		32	1439
R-529	2.0-2.5	HA-15		12	56
R-529	4.0-4.5	HA-15		10	1236
R-529	0.0-0.5	HA-16		19	641
R-529	0.5-1.0	HA-16		32	625
R-529	2.0-2.5	HA-16		10	16
R-529	4.0-4.5	HA-16		19	15
ROA	surface*	B-2	Brown fine sand, some silt (topsoil)	34	--
ROA	3.0	B-2	Till	29	--
ROA	6.0	B-2	Light brown silt	37	--
ROA	7.0	B-2	Till	10	--
ROA	9.0	B-2	Gray silt	4	--
ROA	11.0	B-2	Gray silt. Dry	5	--
ROA	13.0	B-2	As above	4	--
ROA	15.0	B-2	As above	4	--
ROA	surface	S-4	Brown to black topsoil, sandy, small gravels	1,340	--
ROA		SAIC-S4	0.0-2.0"	4,860	--
ROA	0.5	S-4	As above	2,460	--
ROA		SAIC-S4		2,380	--
ROA	1.0	S-4	Brown silty sand (brick chips)	4,290	--
ROA		SAIC-S4		2,860	--

*Smelter Area Investigation Report*

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	2.0	S-4	Brown silty sand, small gravel	1,330	--
ROA		SAIC-S4		5,820	--
ROA	3.0	S-4	Black organic material, silty (brick chips)	2,720	--
ROA	4.0	S-4	Dark brown silty, mainly wood fibers	4,840	--
ROA		SAIC-S4		10,500	--
ROA	6.0	S-4	Tan silty sand, small gravels	270	--
ROA	7.0	S-4	As above	136	--
ROA	11.0	S-4	Light grey silt, very dense, dry	11	--
ROA	4.0	S-22	Light gray, slightly moist silt with occasional fine gravel	18	--
ROA	6.0	S-22	Slightly moist, light gray, slightly fine sand	450	--
ROA	7.0	S-22	Slightly moist, light gray uniform, medium-grained sand	236	--
ROA	9.0	S-22	Slightly moist, light gray sandy silt	233	--
ROA	11.0	S-22	Light gray sand, silt with large (1") iron stained lenses	58	--
ROA	13.0	S-22	Moist, light gray, sandy silt with occasional fine gravel	19	--
ROA	15.0	S-22	Moist, dense, light gray, sandy silt	18	--
ROA	0.0-1.0	SA-1	0-0.2 Asphalt 0.2-1.0 Smelter debris; brick fragments, sand and gravel	1,427	1038
ROA	1.0-2.0	SA-1	Smelter debris; brick fragments, sand and gravel	682	387
ROA	2.0-3.0	SA-1	Smelter debris; brick fragments, sand and gravel	818	89
ROA	3.0-4.0	SA-1	Smelter debris fragments; brick, sand and gravel	320	17
ROA	4.0-5.0	SA-1	Brick: red, dry intact with gray and white sand layers	3,841	1083
ROA	6.0-6.25	SA-1	Brick: red, dry intact with gray and white sand layers. Refusal at 6.3 feet on smelter foundation.	515	77
ROA	0.0-1.0	SA-2	0.0-0.2 Asphalt 0.2-1.0 Gravelly sand w/trace brick fragments at 1'	2,351	1141
ROA	1.0-2.0	SA-2	Smelter debris; brick and wood chunks	4,171	1128
ROA	2.0-3.0	SA-2	Silty sand	2,014	10
ROA	3.0-4.0	SA-2	Silty sand	158	10
ROA	4.0-5.0	SA-2	Silty sand	--	--

Smelter Area Investigation Report

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	5.0-6.0	SA-2	Silty sand	40	11
ROA	6.0-7.0	SA-2	Silty sand	17	10
ROA	0.0-1.0	SA-3	Sandy loam	13	1315
ROA	1.0-2.0	SA-3	Sand	21	118
ROA	2.0-3.0	SA-3	2.0-2.3' Sand 2.3-3.0' Silt	21	106
ROA	3.0-4.0	SA-3	Silt	10	10
ROA	0.0-1.0	SA-4	Silty loam, trace brick fragments	11,792	12116
ROA	1.0-2.0	SA-4	Smelter debris; brick fragments 2" chunk of wood at top	2,618	530
ROA	2.0-3.0	SA-4	Silty sand	13	22
ROA	3.0-4.0	SA-4	Silty sand	26	14
ROA	4.0-5.0	SA-4	Silty sand	14	10
ROA	5.0-6.0	SA-4	Silty sand	10	10
ROA	Surface	SAI-SS			
ROA	Surface	SAI-SS4			
ROA	surface	SAIC-S1		319	--
ROA	0.5	SAIC-S1		215	--
ROA	1.0	SAIC-S1		438	--
ROA	2.0	SAIC-S1		1,010	--
ROA	3.0	SAIC-S1		333	--
ROA	surface	SAIC-S2		309	--
ROA	0.5	SAIC-S2		142	--
ROA	1.0	SAIC-S2		112	--
ROA	2.0	SAIC-S2		952	--
ROA	3.0	SAIC-S2		865	--
ROA	surface	SAIC-S3		286	--
ROA	0.5	SAIC-S3		257	--
ROA	1.0	SAIC-S3		915	--
ROA	2.0	SAIC-S3		4,700	--
ROA	3.0	SAIC-S3		2,340	--
ROA		SAIC-S4		10,500	--
ROA		SAIC-S4		2,380	--
ROA		SAIC-S4		5,820	--
ROA		SAIC-S4		2,860	--
ROA	surface	SAIC-S5		6,890	2150
ROA	surface	SAIC-S6		138	289
ROA	surface	SAIC-S7		480	772
ROA	surface	SAIC-S22	Pre-RJ sample: no sample description 0.0-2.0"	1,490	--

*Smelter Area Investigation Report*

Area	Sampling Depth (feet)	Location	Description	Arsenic Concentration (mg/Kg)	Lead Concentration (mg/Kg)
ROA	0.5	SAIC-S22	As above	4,230	--
ROA	1.0	SAIC-S22	As above	3,590	--
ROA	2.0	SAIC-S22	As above	1,710	--
ROA	3.0	SAIC-S22	As above	455	--
ROA	surface	SAIC-S23		475	1500
ROA	surface	SAIC-S24		395	--
ROA	0.5	SAIC-S24		456	--
ROA	1.0	SAIC-S24		152	--
ROA	2.0	SAIC-S24		48	--
ROA	3.0	SAIC-S24		3	--
ROA	surface	SAIC-S77		114	--
ROA	0.5	SAIC-S77		10	--
ROA	1.0	SAIC-S77		34	--
ROA	2.0	SAIC-S77		24	--
ROA	surface	SAIC-S78		1,460	827
ROA	0-0.5	TB-3		18	20
ROA	2-3.5	TB-3		218	158
ROA	37.5-39.0	TB-3		291	10
ROA	5-6.5	TB-3		20	31
ROA	10-11.5	TB-3		660	40
ROA	15-16.5	TB-3		194	10
ROA	20-21.5	TB-3		206	10
ROA	25-26.5	TB-3		10	13
ROA	30-31.5	TB-3		10	10
ROA	35-36.5	TB-3		10	10
ROA	0.0-1.0	TP-3	Silty loam	1,704	911
ROA	1.0-2.0	TP-3	Abundant red brick fragments	9,043	2425
ROA	2.0-3.0	TP-3	Intact flue structure filled with grey sand with yellow staining (flue dust)	2,686	89
ROA	3.0-4.0	TP-3	As above	28,579	51
ROA	4.0-5.0	TP-3	Intact brick foundation	1,883	58
ROA	5.0-6.0	TP-3	As above	6,902	794
ROA	6.0-7.0	TP-3	As above	7,084	275
ROA	7.0-8.0	TP-3	Silt	203	13
ROA	8.0-9.0	TP-3	Sand and silt	507	10
ROA	9.0-10.0	TP-3	Silty sand	655	10
ROA	10.0-11.0	TP-3	Silty sand	744	12

\*. Actual depths found in database.